

**VASAVI COLLEGE OF ENGINEERING
(AUTONOMOUS)**

IBRAHIMBAGH, HYDERABAD-500 031
ACCREDITED BY NAAC WITH A++ GRADE

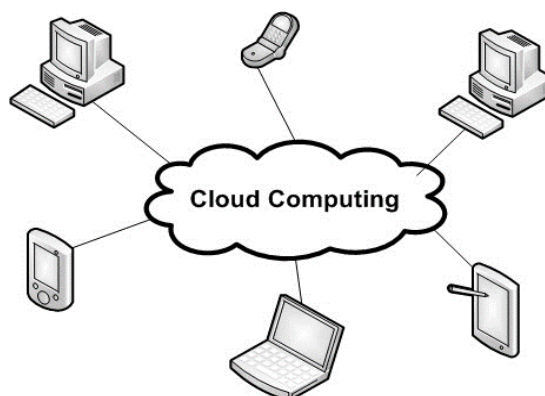
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Affiliated to Osmania University, Hyderabad-07

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**VASAVI ACADEMY OF EDUCATION
Hyderabad**



**SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR
B.E. (IT) III and IV Semesters with effect from 2023-2024
(For the batch admitted in 2022-23)
(R-22)**



DEPARTMENT OF INFORMATION TECHNOLOGY

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VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

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IBRAHIMBAGH, HYDERABAD-500 031

Vision

Striving for a symbiosis of technological excellence and human values.

Mission

To arm young brains with competitive technology and nurture holistic development of the individuals for a better tomorrow.

Quality Policy

Education without quality is like a flower without fragrance. It is our earnest resolve to strive towards imparting high standards of teaching, training and developing human resources.

DEPARTMENT OF INFORMATION TECHNOLOGY

Vision

To be a center of excellence in the emerging areas of Information Technology.

Mission

- Provide a comprehensive learning experience on the latest technologies and applications.
- Equip the stakeholders with latest technical knowledge and leadership skills with collaboration to become competent professionals.
- Motivate innovation and contribute to the societal issues with human values and professional ethics.



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DEPARTMENT OF INFORMATION TECHNOLOGY

Programme Educational Objectives (PEOs) for IT Program

A Graduate of Information Technology will be able to:

PEO1: Pursue higher studies in multidisciplinary areas with research orientation.

PEO2: Develop core IT competencies aligned with emerging industry trends to become global leaders with ethical values.

PEO3: Engage in continuous learning and address the societal problems with sustainable solutions.

Program Specific Outcomes (PSOs) for IT Program

Our students, upon graduation from the program, will be able to

PSO1: Identify and develop software solutions using programming languages, tools and AI/ML concepts.

PSO2: Design, develop and maintain secure stand-alone, embedded and networked systems.

PSO3: Analyze the architectures of autonomous or semi-autonomous intelligent systems and apply to real-time scenarios.

Program Outcomes (POs) for IT Program

At the end of the program, the graduates will demonstrate

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROMOTION RULES

1. Attendance and Sessional marks requirements:

1	B.E(4yrs)	Attendance: Minimum aggregate attendance required to eligible to attend semester end exams is 75% and 65% with Medical Condonation respectively.
		Sessional Marks: Minimum aggregate of sessional marks required to become eligible for appearing semester end examinations is 40%

II. Promotion rules for B.E(4YDC) course

S No	Semester/Class	Conditions to be fulfilled
1	I-SEM TO II- SEM	Regular course of study of I-SEM and 40% aggregate CIE marks in I-SEM
2	II-SEM TO III SEM	a. Regular course of study of II SEM and
		b. 40% aggregate CIE marks in II-SEM
		c. Must have secured at least 50% of total credits prescribed for I and II SEMs together
3	III-SEM to IV-SEM	a. Regular course of study of III-SEM and
		b. 40% aggregate CIE marks in III-SEM
4	IV-SEM to V-SEM	a. Regular course of study of IV SEM
		b. 40% aggregate CIE marks in IV-SEM
		c. Passed in all the courses of I and II SEMs
		d. Must have secured at least 50% of total credits prescribed for III and IV SEMs put together
5	V-SEM to VI-SEM	a) Regular course of study V-SEM
		b) 40% aggregate CIE marks in V-SEM
6	VI-SEM to VII-SEM	a. Regular course of study of VI SEM
		b. 40% aggregate CIE marks in VI-SEM
		c. Passed in all the courses of III and IV SEMs
		d. Must have secured at least 50% of total credits prescribed for V and VI SEMs put together
7	VII-SEM to VIII-SEM	a. Regular course of study of VII SEM
		b. 40% aggregate CIE marks in VII SEM
8	Eligibility to appear VIII-SEM exams	a. Regular course of study of VIII SEM and 40% aggregate CIE marks in VIII-SEM

III. Promotion rules for B.E(3 YDC) course (Lateral Entry)

S No	Semester/Class	Conditions to be fulfilled
1	III-SEM to IV-SEM	a. Regular course of study of III-SEM and
		a. 40% aggregate CIE marks in III-SEM
2	IV-SEM to V-SEM	e. Regular course of study of IV SEM
		f. 40% aggregate CIE marks in IV-SEM
		g. Must have secured at least 50% of total credits prescribed for III and IV SEMs put together
3	V-SEM to VI-SEM	c) Regular course of study V-SEM
		d) 40% aggregate CIE marks in V-SEM
4	VI-SEM to VII-SEM	e. Regular course of study of VI SEM
		f. 40% aggregate CIE marks in VI-SEM
		g. Passed in all the courses of III and IV SEMs
		h. Must have secured at least 50% of total credits prescribed for V and VI SEMs put together
5	VII-SEM to VIII-SEM	c. Regular course of study of VII SEM
		d. 40% aggregate CIE marks in VII SEM
6	Eligibility to appear VIII-SEM exams	b. Regular course of study of VIII SEM and 40% aggregate CIE marks in VIII-SEM

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-22)
B.E. – INFORMATION TECHNOLOGY : THIRD SEMESTER (2023 - 2024)

B.E (IT) III-Semester								
Course Code	Course Name	Scheme of Instruction			Scheme of Examination			
		Hours per week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
U22BS330MA	Discrete Mathematics	3	-	-	3	60	40	3
U22ES310IT	Digital Electronics & Logic Design	3	-	-	3	60	40	3
U22PC310IT	Data Structures	3	-	-	3	60	40	3
U22PC320IT	Object Oriented Programming	3	-	-	3	60	40	3
U22OE3XXXX	Open Elective – I	2	-	-	3	60	40	2
U22HS320EH	Skill Development Course – I (Communication Skills in English–I)	1	-	-	2	40	30	1
U22PE310IT	Skill Development Course – II (Technical Skills – I)	1	-	-	2	40	30	1
PRACTICALS								
U22PC311IT	Data Structures Lab	-	-	3	3	50	30	1.5
U22PC321IT	Object Oriented Programming Lab	-	-	3	3	50	30	1.5
U22PC331IT	Network Engineering Lab	-	-	2	3	50	30	1
U22PW319IT	Mini Project – I	-	-	2	3	50	30	1
	Co-Curricular Activities-I	-	-	-	-	-	-	-
	Extra-Curricular Activities-I	-	-	-	-	-	-	-
	Library / Sports / Mentor Interaction	-	-	-	-	-	-	-
<ul style="list-style-type: none"> • Student should acquire one NPTEL Certification Course equivalent to 2 credits (8 weeks) by the end of VI Semester. • Students opting for Honours should complete one NPTEL Course of 2 credits (8 Weeks) by the end of IV Semester. 								
Total		16	-	10	-	580	380	21
Grand Total		26			--	960		

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Hyderabad-500031, Telangana State

DEPARTMENT OF MATHEMATICS**DISCRETE MATHEMATICS**

for B.E., III- Sem., (CBCS)

(For IT only)

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code ::U22BS330MA
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>At the end of the course students will be able to:</i>
1. Understand the Propositions and their equivalences, predicates and quantifiers and learn various proof strategies. 2. Study the concepts of number theory such Modular Arithmetic, Congruences and basic cryptography etc., 3. Understand the basics of counting, combinatorial, and various methods of solving Recurrence relations. 4. Understand the Relations, Equivalence relations, Posets and Hasse diagrams. 5. Analyze the concepts of Graphs.	1. Use the logical notation to define and reason about fundamental mathematical concepts and <i>synthesize</i> induction hypothesis and simple <i>Induction</i> proofs. 2. Prove the elementary properties of modular arithmetic and basic cryptography and apply in computer science 3. Calculate the number of possible outcomes of elementary combinatorial processes such as permutations and combinations Model and analyse computational processes using analytic and Combinatorial methods. 4. Prove the whether a given relation is an equivalence relation/poset and will be able to draw a Hasse diagram. 5. Apply the graph theory models of data structures and to solve problems of connectivity.

UNIT – I**Logic:** Logic- Logical connectives- Propositional equivalences– Predicates and quantifiers.**Mathematical Reasoning, Induction:** Proof Strategy- Methods of Proofs- Mathematical Induction- Second Principle of Mathematical Induction.**UNIT – II****Number Theory:** The Integers and Division- Division Algorithm- Fundamental Theorem of Arithmetic –Modular Arithmetic-Integers and Algorithms- Euclidean Algorithm. Applications of Number Theory-Linear Congruences- The Chinese Remainder Theorem (without Proof)- Fermat's Little Theorem- Public key cryptography- RSA Encryption and Decryption.**UNIT – III****Counting:** Basics of counting- Pigeonhole principle –Permutations & Combinations- Pascal's Identity- Vandermonde's Identity.**Advanced Counting Techniques:** Recurrence relations: Solving Recurrence Relations- Linear Homogeneous and Non-Homogeneous Recurrence relations.**UNIT – IV****Relations:** Relations – Properties -Representing relations - Equivalence Relations - Partial Orderings- Poset- Hasse diagrams – Maximal & Minimal Elements.**UNIT –V****Graph Theory:** Introduction- Graph terminology-Types of graphs-Basic theorems- Representing Graphs and Graph Isomorphism - Connectivity- Euler and Hamiltonian paths - Planar graphs- Euler's Formula.**Learning Resources:**

- Kenneth H.Rosen – Discrete Mathematics and its application – 5th edition, Mc Graw – Hill, 2003.
- Joel. Mott. Abraham Kandel, T.P.Baker, Discrete Mathematics for Computer Scientist & Mathematicans, Prentice Hall N.J., 2ndedn, 1986.
- Discrete and Combinatorial Mathematics by Ralph P. Grimaldi , Pearson International
- J.P.Trembly, R.Manohar, Discrete Mathematical Structure with Application to Computer Science, Mc Graw- Hill – 1997.
- R.K. Bisht, H.S.Dhami - Discrete Mathematics, Oxford University Press, 2015.
- <http://mathworld.wolfram.com/topics>
- <http://www.nptel.ac.in/course.php>

The break-up of CIE : Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90	Minutes		

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DEPARTMENT OF INFORMATION TECHNOLOGY**DIGITAL ELECTRONICS AND LOGIC DESIGN****SYLLABUS FOR III-SEMESTER**

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : U22ES310IT
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
1. Introduce the concepts of combinational and sequential circuit design.	1. Simplify Boolean Functions using algebraic and K-map techniques to specific number of literals.
2. Introduce VHDL Programming Language to implement digital circuits.	2. Design combinational circuits using fundamental logic gates and programmable logic devices for a given problem.
	3. Draw the circuits of different types of flipflops and explain their operation using Truth tables and excitation tables.
	4. Analyze any given synchronous or asynchronous sequential circuit and design synchronous or asynchronous sequential circuits for a given specification of the problem.
	5. Implement combinational and sequential circuits using VHDL programming language.

UNIT – I:

Introduction to Boolean algebra and number system, Logic Gates, Optimized implementation of logic functions – Karnaugh Map, Strategies for minimization of product-of-sum and sum-of-product functions. Multiple output circuits. NAND and NOR logic networks, Cost functions, Introduction to CAD tools and VHDL

UNIT – II:

Combinational circuit building blocks – Multiplexers. Decoders. Encoders. Code converters, Arithmetic comparison circuits. General structures of a PLA, gate level diagram, schematic diagram, PAL. Structure of CPLDs and FPGAs, 2-input and 3-input lookup tables(LUT). Design of Arithmetic-circuits using CAD tools. VHDL for Combinational circuits

UNIT – III:

Basic Latch, Gated SR Latch, gated D Latch, T Flip-flop, JK Flip-flop, excitation tables. Master-Slave edge triggered flip-flops. Set up and hold time of a flip-flop. Registers, Counter. Using registers and counters with CAD tools. Design examples using VHDL.

UNIT – IV:

Synchronous Sequential Circuits – Analysis of Synchronous sequential Circuits Basic design steps. State-Assignment problem Moore and Mealy state models. State minimization, Design of FSM with CAD Tools. Implementation using VHDL.

UNIT – V:

Introduction to Asynchronous sequential circuits, Analysis of Asynchronous sequential circuits. Hazards: static and dynamic hazards. Significance of Hazards. Clock skew, ASM Charts, Digital Hardware Design Flow.

Learning Resources :

1. M. Moris Mano, Charles R. Kime, Logic and Computer Design Fundamentals, 2nd edition, Pearson Education Asia, 2001.
2. Stephen Brown , Zvonko Vranesic – Fundamentals of Digital Logic with VHDL design, McGraw Hill – 2000.
3. Virendrakumar Digital Electronics Theory & Experiments, New Age International Publishers, 2002
4. John F. Walkerly, Digital Design : Principles and Practices, Pearson India, 4th Edition.
5. Ronald J. Tocci, Neal S. Widmer, Gregory L. Moss, Digital Systems: Principles and Applications, Pearson India, 10th Edition.
6. <https://nptel.ac.in/courses/117106086/>

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

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DEPARTMENT OF INFORMATION TECHNOLOGY

DATA STRUCTURES
SYLLABUS FOR III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks :60	Course Code : U22PC310IT
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
1. Demonstrate linear and non-linear data structures and their applications. 2. Illustrate searching and sorting techniques.	1. Understand asymptotic notations, operations on arrays and stacks, and evaluate arithmetic expressions. 2. Analyze search, insert and delete operations on queues and linked list. 3. Compare complexities of insertion, deletion and search operations on trees, binary search trees and balanced binary search trees. 4. Understand the operations on multiway search trees and apply graph search algorithms to find minimal cost Spanning trees. 5. Evaluate the complexities of sorting, searching and hashing techniques.

UNIT-I:

Basic Concepts: Elementary Data Organizations, Data Abstraction. Data Structures Introduction and Operations: insertion, deletion, traversal. Performance analysis - time complexity and space complexity, Asymptotic Notations- Big O, Omega and Theta notations.

Arrays: Arrays – ADT, Polynomials, Sparse matrices, Strings-ADT, Pattern Matching

Stacks: Stack Abstract Data Type, Representation of a Stack using Arrays –Implementation of Stack Operations - Stack Applications: Infix to postfix Transformation - Evaluating Arithmetic Expressions.

UNIT-II:

Queues: Queue Abstract Data Type- Representation of a Queue using array - Implementation of Queue Operations - Applications of Queues - Circular Queues.

Linked List: Introduction – Singly Linked list -Operations on a singly linked list -Dynamically Linked Stacks and Queues Doubly linked list-Operations on a doubly linked list, Circular Linked list, Polynomial manipulation - Operations, Sparse Matrices.

UNIT-III:

Trees: Introduction, Binary Trees, Binary Tree Traversals, Priority Queues, Heaps.

Binary Search trees (BST) : Definition, Searching a BST, Insertion into a BST, Deletion from a BST.

Efficient Binary Search Trees: AVL Trees, Red-Black Trees, Splay Trees.

UNIT-IV:

Multiway Search Trees: m-way search trees-Definition and Properties, Searching an m-way search tree, B-Trees-Definition and properties, Number of Elements in a B-Tree, Insertion into a B-Tree and Deletion from a B-Tree.

Trie Data Structure : Introduction, Basic Operations

Graphs: The Graph ADT, Elementary graph operations - Depth First Search (DFS), Breadth First Search (BFS), Minimal Cost Spanning Trees- Kruskal's Algorithm, Prim's Algorithm.

UNIT-V:

Sorting and complexity analysis: Insertion Sort, Heap Sort, Topological Sort

Searching: Linear Search, Binary Search Techniques and their complexity analysis.

Hashing : Introduction, Static Hashing – Hash tables, Hash functions, Overflow handling.

Learning Resources:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2/e, Universities Press, 2008
2. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition (2002), Pearson
3. Richard F, Gilberg, B.A. Forouzan, "Data Structures, A Pseudocode Approach with C", Cengage, 2nd Edition
4. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stem 'Introduction to Algorithms' 2002.
5. Tanenbaum A. M , Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson
6. Data Structures through C in depth,S K Srivastava,Deepali Srivastava,BPB publications,2nd Edition
7. <http://nptel.ac.in/courses/106106127/>
8. <http://nptel.ac.in/courses/106103069/>
9. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos/>

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DEPARTMENT OF INFORMATION TECHNOLOGY

OBJECT ORIENTED PROGRAMMING

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U22PC320IT
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
1. Provide an overview of object-oriented programming concepts. 2. Explore java libraries to build applications.	1. Illustrate object-oriented programming features using Java. 2. Perform exception handling and multithreading. 3. Perform I/O operations, String manipulation using java libraries. 4. Implement data structures using collections framework. 5. Design and develop GUI using java libraries.

UNIT-I

Object Oriented Programming Fundamentals :

Object, Class, Abstraction, Encapsulation, Inheritance, Polymorphism.

Java Programming Fundamentals: Overview of Java , Java-keywords, Data types, Variables, Arrays, Command Line Arguments, Operators, Control statements, Structure of a Java class, Classes, Methods, Abstract Classes, Nested Classes. **Interfaces** : Defining interfaces, extending interfaces, implementing interfaces. **Packages:** Creation, importing a package and user defined package.

UNIT-II

Exception Handling: Introduction, types of exceptions, syntax of exception handling code, multiple catch statements, using finally statement, user-defined exceptions.

Multithreaded Programming: Introduction to threads, creating threads, extending the Thread class, implementing the Runnable interface, life cycle of a thread, priority of a thread, synchronization, and Inter-thread Communication.

UNIT-III

Exploring java.io : Java I/O classes and interfaces, Files, Character and Byte Streams Serialization.

Exploring java.lang: Object, Wrapper classes, String, StringBuffer, System.

Exploring java.util: Scanner, StringTokenizer, Date, Calendar.

UNIT-IV

Introduction to Generics: Defining Generics, Generics and Subtyping, Wildcards, Generic Methods.

Introduction to Collections: Collection Framework, Benefits of Collections Framework, Collection Framework Interfaces : Collection , Set, List, Queue, Deque, Sorted Set, Map, Sorted Map. Collection Framework Implementations : HashSet, TreeSet, ArrayList, LinkedList, PriorityQueue, ArrayDeque, HashMap, TreeMap. Traversing Collections. Collection Framework Algorithms : Sorting, Searching.

UNIT-V

GUI Programming : Introduction to Abstract Window Toolkit(AWT), Swing and Applets : AWT Class Hierarchy, Swing Class Hierarchy, Swing Components, Containers, Layout Managers, Event Handling : The Delegation Event Model, Model View Controller Architecture, Modifying Look and Feel, Working with Graphics and Applets.

Learning Resources:

- Herbert Schildt, The Complete Reference Java, 7th Edition, Tata McGraw Hill, 2006.
- James M Slack, Programming and Problem solving with JAVA, Thomson Learning, 2002.
- C Thomas Wu, An Introduction to Object Oriented Programming with Java 5th edition, McGraw Hill Publishing, 2010.
- Y. Daniel Liang , An Introduction to JAVA Programming, Tata McGraw Hill, 2009.
- Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.
- <https://nptel.ac.in/courses/106105191/>
- <https://docs.oracle.com/javase/tutorial/>

The break-up of CIE : Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90 Minutes			

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DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

SKILL DEVELOPMENT COURSE-I -COMMUNICATION SKILLS IN ENGLISH-I

(Common to all branches)

SYLLABUS FOR B.E. -III SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE: 40	Course code: U22HS320EH
Credits : 1	CIE: 30	Duration of SEE: 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
<p>The course will enable the learners to:</p> <ol style="list-style-type: none"> 1. Get students proficient in both receptive and productive skills especially virtual 2. Enable students to understand the importance and method of exchanging information in a formal space- both written and spoken 3. Introduce students to an ideal structure for a presentation and discussion- individually and in groups 4. Develop and improve reading skills needed for college work and reproduce the content based on the situational need. 	<p>At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none"> 1. Introduce themselves effectively and converse in a formal environment especially in the online space 2. Write emails with appropriate structure and content 3. Use appropriate structure based on the content employing appropriate transitions in written and spoken communication 4. Paraphrase content and write an effective summary

Unit 1

Delightful Descriptions

- 1.1 Introductions on an Online Forum
- 1.2 Making Observations and Giving Opinion
- 1.3 Recalling and Describing

Unit 2

Formal Conversation Skills

- 2.1 Ask for Information
- 2.2 Give Information
- 2.3 Give Feedback
- 2.4 Seek Permission

Unit 3

Technical Expositions and Discussions

- 3.1 Classification
- 3.2 Sequence
- 3.3 Compare and Contrast
- 3.4 Cause and Effect
- 3.5 Problem and solution

Unit 4

Rational Recap

- 4.1 Paraphrasing - Written
- 4.2 Summarizing - Written
- 4.3 Paraphrasing – Spoken
- 4.4 Summarizing – Spoken

METHODOLOGY	ASSESSMENTS
<ul style="list-style-type: none"> - Case Studies - Demonstration - Presentations - Expert lectures - Writing and Audio-visual lessons 	<ul style="list-style-type: none"> - Online assignments - Individual and Group

Learning Resources:

learn.talentsprint.com

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal tests	:	2	Max. Marks	:	20
2	No. of assignments	:	2	Max. Marks	:	5
3	No. of Quizzes	:	2	Max. Marks	:	5
Duration of Internal Tests		:	90 Minutes			

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DEPARTMENT OF INFORMATION TECHNOLOGY

SKILL DEVELOPMENT COURSE-I -TECHNICAL SKILLS-I

SYLLABUS FOR B.E. III-SEMESTER

L:T:P (Hrs./week): 1:0:0	SEE Marks : 40	Course Code : U22PE310IT
Credits : 2	CIE Marks : 30	Duration of SEE : 2 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The course will enable the students to	<i>On completion of the course, students will be able to</i>
<ul style="list-style-type: none"> ❖ Understand the significance of Competitive Coding ❖ Prepare the students for the contests relative to the concepts learnt ❖ Build confidence in coding using Linear Data structures ❖ Learn essential algorithms for Competitive Coding 	<ul style="list-style-type: none"> ❖ Solve scenario based problems on linked lists, Recursive Algorithms, Search & Sort Algorithms, Divide & Conquer Strategies and use memory manipulation functions. ❖ Learn linear data structures usage in various applications with scenariobased problem solving through coding

Phase I

#1: Code Complexity Analysis & Linear List data

Problem solving through Coding, Compare and contrast coding and competitive coding, Various approaches for problem solving, techniques for competitive coding, Orientation on Competitive coding on coding platforms like Codechef/ Codeforces/ Leetcode/ Hackerrank etc

Precise coding techniques implementing the evaluation of the language supported expressions, code complexity analysis, Linear/ Logarithmic/ Super linear/ Polynomial/ Exponential/ Recursion Algorithm analysis, Problem Solving using Linear list data, Subscripts, 2D Array Subscript, RMO & CMO Representation, Matrix Problems. Company Specific Examples & Competitive Programming Practice Problems.

Contextual implementation using Competitive Coding using global coding platforms: Code chef/ Leet code / Codeforces / Hackerrank etc

#2: Memory Manipulation Methods and Problem Solving on String data

Pointer Variable, Pointer Arithmetic, Memory Layout, Runtime memoryallocation, Problem Solving on String Data, String handling methods, Examples, Practice Problems

#3: Problem Solving using Linked List data

Implementing a Structure member pointer reference, Coding solutions for Linked list manipulation, Solutions for order statistic problems on linked lists: Comparison/ Cycle Detection/ Merge Point Detection/ Merging the lists, Codingsolution for the circular linked data and Double linked data, coding problems, Examples, Practice problems

#4: Problem Solving using Abstract data structures: Stacks

Problem solving using Stacks, Coding solutions for the implementation of stack using an array, Coding solutions for the implementation of stack using a linked list. Problem solving on expression conversion and evaluation, Examples, Practice problems

#5: Problem Solving through Queues & Search-Sort Algorithms

Problem solving using Queues, Coding solutions for the implementation ofqueue using an array/ linked list, Divide & Conquer Strategies: Linear Vs Binary Search Analysis, Bubble sort and Selection Sort Analysis, Examples, Practice problems

#6: Problem Solving through Divide & Conquer Strategies

Divide & Conquer Strategies: Quick sort Analysis, Merge Sort Analysis, Min/Power functions, Examples, Practice problems.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY**DATA STRUCTURES LAB**

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:3	SEE Marks : 50	Course Code : U22PC311IT
Credits : 1.5	CIE Marks : 30	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
1. Demonstrate stacks, queues, linked lists and its applications. 2. Provide hands-on experience to perform searching, sorting problems insertion and deletion operations on non-linear data structures.	1. Implement operations on stacks, queues and linked lists and evaluate expressions. 2. Execute insert, search and delete operations on trees. 3. Implement priority queues, heaps and sorting. 4. Implement graph traversal algorithms. 5. Implement multi way search trees.

- Menu driven program that implements Stacks using arrays for the following operations
a)create b)push c)pop d) peek
- Implementation of Infix to Postfix Conversion and evaluation of postfix expression.
- Menu driven program that implements Queues using arrays for the following operations
a)create b)insert c)delete d) display
- Menu driven program that implements Circular Queues for the following operations
a)create b)Insert c)delete d) display
- Implementation of Singly Linked List, Stack using Singly Linked List, Queue using Singly Linked List.
- Implementation of polynomial operations using Linked List.
- Implementation of Doubly Linked List, Circular linked list.
- Implementation of Operations on Binary Tree (Insert, Delete, Level Order, Search)
- Implementation of Recursive and Iterative Traversals on Binary Trees.
- Implementation of Operations on Priority Queues and Heaps.
- Implementation of Operations on Binary Search Tree.
- Implementation of operations on AVL Tree.
- Implementation of Breadth First search Traversal on Graphs.
- Implementation of Depth First search Traversal on Graphs.
- Implementation of Insertion Sort, Heap Sort.
- Implementation of B-Trees

Learning Resources

- Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2/e, Universities Press, 2008
- Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition (2002), Pearson
- Richard F, Gilberg, B.A. Forouzan, "Data Structures, A Pseudocode Approach with C", Cengage, 2nd Edition
- Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stem 'Introduction to Algorithms' 3rd Edition.
- Tanenbaum A. M , Langsam Y. Augenstein M. J, Data Structures using C, Second Edition (2008), Pearson
- Data Structures through C in depth,S K Srivastava,Deepali Srivastava,BPB publications,2nd Edition

Online Resources:

- <http://nptel.ac.in/courses/106106127/>
- <http://nptel.ac.in/courses/106103069/>
- <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-006-introduction-to-algorithms-fall-2011/lecture-videos/>

No. of Internal Tests:	02
Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work	18
Duration of Internal Test:	3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY

OBJECT ORIENTED PROGRAMMING LAB
SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:3	SEE Marks : 50	Course Code : U22PC321IT
Credits : 1.5	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
1. Illustrate the key features of Object-Oriented Programming, threads and files. 2. Demonstrate command line as well as graphical user interface applications.	1. Implement object-oriented programming features using Java. 2. Implement exception handling and multithreading. 3. Execute I/O and String manipulation operations using java libraries. 4. Implement data structures using collections framework. 5. Develop GUI using java libraries.

JAVA API (java.lang package)

1. A program to illustrate the concept of arrays in Java.
2. A program to demonstrate the use of command line arguments.
3. A program to illustrate the concept of inheritance.
4. A program to illustrate the concept of dynamic polymorphism.
5. A program to illustrate the concept of abstract class.
6. A program to demonstrate various access specifiers and their scope using packages.
7. A program to demonstrate how multiple inheritance is achieved using interfaces.
8. A program to demonstrate exception handling by using throw, finally & multiple catch statements.
9. A program to illustrate the concept of user-defined exception.
10. A program to create multiple threads using Thread class and Runnable interface.
11. A program to illustrate the concept of thread synchronization.

JAVA API (java.io package)

- 12.a) A program to illustrate the use of FileInputStream and FileOutputStream
- b) A program to illustrate the use of BufferedInputStream and BufferedOutputStream.
- c) A program to illustrate the use of ObjectInputStream and ObjectOutputStream.

JAVA API (java.util package)

- 13.a) A program to demonstrate the use of Scanner class to read user input.
- b) A program to demonstrate the use of StringTokenizer.
- c) A program to demonstrate the use of Date and Calendar.
14. A program to demonstrate the use of Collection framework classes and algorithms.

JAVA API (java.awt , java.awt.event and , javax.swing package)

15. a) An application involving GUI with different controls using AWT.
- b) An application involving GUI with different controls using Swing.
- c) An application using Applet.

Learning Resources:

1. Herbert Schildt, The Complete Reference Java, 7th Edition, Tata McGraw Hill, 2006.
2. James M Slack, Programming and Problem solving with JAVA, Thomson Learning, 2002.
3. C Thomas Wu, An Introduction to Object Oriented Programming with Java 5th edition, McGraw Hill Publishing, 2010.
4. Y. Daniel Liang , An Introduction to JAVA Programming, Tata McGraw Hill, 2009.
5. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.
6. <https://nptel.ac.in/courses/106105191/>
7. <https://docs.oracle.com/javase/tutorial/>

No. of Internal Tests:	02
Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work	18
Duration of Internal Test:	3 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY**NETWORK ENGINEERING LAB**

SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks : 50	Course Code : U22PC331IT
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
1. Introduce the fundamental concepts in Networking, OSI and TCP/IP protocol suite. 2. Demonstrate Switching, Routing and Wireless networking concepts using Packet Tracer tool.	1. Identify and Configure LAN switching technologies 2. Implement IP addressing and subnetting. 3. Design and configure routers, switches and wireless devices. 4. Build configuration for DHCP server and client. 5. Identify and provide security to LAN Ports.

List of Experiments:

- Basic Networking Commands**-The networking commands like ipconfig, netstat, ping, system info, lookup, traceroute, hostname, Arp are discussed.
- Configure Initial Switch Settings**- Connect a switch to a PC via a console cable, specify the switch's name using IOS commands, then set up passwords to safeguard the switch using Packet Tracer Simulator. Save the switch's configuration to its NVRAM (Using IOS commands).
- Connect a Wired and Wireless LAN**- Connect all devices in the supplied activity using guided media in accordance with the directions on the instructions page by using the packet tracer simulator and verify end-to-end connectivity
- Subnet an IPv4 Network**- Create an IPv4 Network Subnetting Scheme, configure the devices, test the network and troubleshoot it.
- Sub-netting Scenario**- Design an IP addressing scheme using FLSM (Fixed Length Subnet Mask) and assign IP addresses to network devices as per instructions given in instructions page in packet tracer activity and check connectivity.
- Design and Implement a VLSM addressing Scheme**- Given a network address and host requirements, create a VLSM (Variable Length Subnet Mask) addressing scheme by setting up addressing on network hosts, switches, and routers. Verify IP connectivity and troubleshoot connectivity issues as required.
- Configure IPv6 Addressing Scheme**- To Set Up Topology by configuring basic Router and Switch Settings and IPv6 Addresses manually and to verify end-to-end Connectivity
- Build a small network.** - Create a new IPv4 addressing scheme that will accommodate 4 subnets using the 192.168.0.0/24 network. 25 hosts are required by the IT department.(The Web server, ISP cluster, and Central router have been completely configured). 50 hosts are required for the sales division. 100 hosts are needed in the subnet for the remaining employees. To support 25 hosts, a Guest subnet will be implemented in the future. On R1, you must also complete the fundamental interface and security setups. On switches S1, S2, and S3, you will configure the Switch Virtual interface and the fundamental security settings.
- Configure SSH**- Replace Telnet protocol with SSH using CISCO IOS Commands on networking devices to encrypt communication between client and server and to verify connectivity.
- Implement VLANs and Trunking**- To configure and implement Virtual LANs by assigning ports and create static and dynamic trunks.
- Configure Router-on-a-Stick Inter-VLAN Routing:** - To add VLANs to a switch and configure sub interfaces on the router in order to test the connectivity with Inter VLAN Routing.
- Configure DHCPv4**- To configure a router as a DHCP server, PCs as DHCP clients and other routers as DHCP relay agents as per the instructions given in packet tracer activity, verify DHCP and test the connectivity.
- Implement Port Security**-In the given Topology Implement Port Security on Switches and verify.
- Configure a Wireless Network**- To connect wired and wireless devices to a wireless router, configure and add access point to extend wireless coverage.

Learning Resources:

<https://www.netacad.com/courses/networking/ccna-introduction-networks>

<https://www.netacad.com/courses/networking/ccna-switching-routing-wireless-essentials>

No. of Internal Tests:	02
Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work	18
Duration of Internal Test:	2 Hours

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY

MINI PROJECT-I
SYLLABUS FOR B.E. III-SEMESTER

L:T:P(Hrs./week):0:0:2	SEE Marks : 50	Course Code : U22PW319IT
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
Develop and implement a project using any of the programming languages/simulation tools/electronic components.	<ol style="list-style-type: none"> 1. Apply theoretical knowledge to design solutions for real life problems. 2. Demonstrate the ability to locate and use technical information from multiple sources. 3. Develop team spirit and demonstrate an understanding of professional ethics. 4. Demonstrate the ability to communicate effectively in speech and in writing. 5. Develop the capability for lifelong learning through advanced technology.

1. During the implementation of the projects, Personnel Software Process (PSP) has to be followed.
2. Two reviews will be conducted.
3. Report of the project work has to be submitted for evaluation.

Continuous Internal Evaluation (CIE) – 30 marks : To be evaluated by the Internal Examiner

Assesment-1 : [5 Marks]

To be conducted on week-2 : Review of problem selection and Abstract.

Assesment-2: [10 Marks]

To be conducted on week-7: Review of project design and initial phase of implementation.

Assesment-3: [15 Marks]

To be conducted on week-15 : Review of final implementation, presentation and report.

Semester End Examination(SEE) – 50 marks: To be evaluated by the External Examiner

Evaluation is done based on the following deliverables:

PowerPoint Presentation	[10 Marks]
Demonstration of the application	[20 Marks]
Project report	[10 Marks]
Viva Voce	[10 Marks]

External Examiner should be appointed from other premier Institutes OR from the industry.

**III – Semester Open Electives
(Open Elective - I)
Academic Year : 2023-24**

S. No.	Dept.	Streams	Course Code	Name of the Course	Credits
1	Civil	General Pool	U22OE310CE	Green Buildings	2
2	ECE	Communication Engineering Stream	U22OE340EC	Introduction to Signals and Systems	2
3	EEE	General Pool	U22OE310EE	Non Conventional Energy Sources	2
4	Mechanical	Unmanned Aerial Vehicles	U22OE310ME	Introduction to Unmanned Aerial Vehicles	2
5		Robotics	U22OE320ME	Introduction to Industrial Robotics	2
6		General Pool	U22OE330ME	Introduction to Automobile Engineering	2
7	Chemistry	Polymeric Materials	U22OE310CH	Materials for Engineers	2
8	H&SS	General Pool	U22OE310EH	Learning To Learn	2
9	Mathematics	General Pool	U22OE310MA	Linear Algebra	2
10	Physics	General Pool	U22OE310PH	Smart Materials And Applications	2
9		Semiconductor Physics and Device Applications	U23OE320PH	Essentials Of Semiconductor Physics	2
10		Materials Science For Engineers	U22OE330PH	Fundamentals Of Materials Science	2

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF CIVIL ENGINEERING

GREEN BUILDINGS (Open Elective-I)

SYLLABUS FOR B.E. III-SEMESTER

L : T : P (Hrs./week):2:0:0	SEE Marks:60	Course Code: U22OE310CE
Credits: 2	CIE Marks:40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
Objectives of this course are to:	Upon the completion of this course the students will be expected to:
1. Learn the principles of planning and orientation of buildings.	1. Explain the principles of building planning, its bylaws and provide facilities for rainwater harvesting.
2. Environmental implications of natural and building materials along with green cover	2. Analyse the aspects of energy, water and waste management in buildings.
3. Acquire knowledge on various aspects of green buildings	3. Understand the concepts of green building technologies.
	4. Understand rating systems of GRIHA IGBC and LEED.

UNIT-I: Planning of buildings: Principles of planning, Relevant building bylaws, site selection for buildings, orientation of buildings, Provision of rain water harvesting

UNIT-II: Building-Energy-Implications: Environmental implications of buildings energy, carbon emissions, water use, waste disposal; Building materials: sources, methods of production and environmental Implications. Green building materials and recycling, Green cover and built environment

UNIT-III: Green Building Technologies: Introduction- Necessity - Concept of Green building. Principles of green building – Site selection criteria for Green Buildings – effective cooling and heating systems – effective electrical systems-Passive solar architecture - effective water conservation systems

UNIT-IV: Certification Systems: Certification systems- Green Rating for Integrated Habitat Assessment (GRIHA), Indian Green Building Council (IGBC) and Leadership in Energy and Environmental Design (LEED), case studies

Learning Resources:

1. Kumara Swamy N.Kameswara Rao A., Building Planning And Drawing, Charotar, Publications, 2013.
2. Shahane, V. S, "Planning and Designing Building", Poona, Allies Book Stall, 2004.
3. Michael Bauer, Peter Mösle and Michael Schwarz "Green Building – Guidebook for Sustainable Architecture" Springer, 2010.
4. Tom Woolley, Sam Kimmins, Paul Harrison and Rob Harrison "Green Building Handbook" Volume I, Spon Press, 2001.
5. Mili Majumdar, "Energy-efficient buildings in India" Tata Energy Research Institute, 2002.
6. TERI "Sustainable Building Design Manual- Volume I & II" Tata Energy Research Institute, 2009.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests		:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Introduction to Signals and Systems
(Communication Engineering Stream: Open Elective - I)
SYLLABUS FOR B.E. III – SEMESTER (other branches)

L:T:P (Hrs./week) : 2:0:0	SEE Marks : 60	Course Code: U22OE340EC
Credits : 2	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
1. Define and classify continuous and discrete time signals and systems. 2. Determine frequency domain characteristics of continuous and discrete time signals.	On completion of the course, students will be able to 1. Analyze basic signals and systems in continuous time domain. 2. Apply the properties of Fourier transformation techniques to analyze continuous time domain signals and systems in frequency domain. 3. Apply Laplace Transform, analyze the LTI systems. 4. Analyze basic signals and systems in discrete time domain

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2											3	3
CO2	3	3	2											3	3
CO3	3	3	2											3	3
CO4	3	2	1											3	3
CO5	2	3												3	3

UNIT - I

Continuous time signals: types of signals, representation of signals, basic elementary signals, operations on signals.

Continuous time systems: classification of systems - static and dynamic, linear and non linear, time invariant and time variant.

Lab Activity: Generation of elementary signals in MATLAB.

UNIT - II

Continuous time Fourier Series: Introduction, existence, properties, magnitude and phase spectrums

Continuous time Fourier transforms: Introduction, existence, properties, magnitude and phase spectrums.

Lab Activity: Verification of properties of Fourier Transform in MATLAB.

UNIT – III

Laplace transforms: Introduction, existence, Laplace transform of basic elementary signals, properties, inverse Laplace transforms, Analysis of LTI systems using Laplace Transform.

Lab activity: Obtaining system response using Laplace transforms in MATLAB

UNIT - IV

Discrete time signals: types of signals, representation of signals, basic elementary signals, operations on signals.

Discrete time systems: classification of systems - static and dynamic, linear and non linear, time invariant and time variant.

Lab activity: Generation of elementary signals in MATLAB.

Learning Resources:

1. P. Ramakrishna Rao, Signals and Systems, Mc Graw Hill, 2008.
2. Alan V. Oppenheim, Alan S. Willsky and S. Hamid Nawab, Signals and Systems, 2nd ed., PHI, 2009.
3. Nagoor kani, Signals and Systems McGraw Hill, 2013
4. https://onlinecourses.nptel.ac.in/noc19_ee07/preview
(Principle of Signals and Systems by Prof. Aditya K Jagannatham)
5. <https://www.edx.org/course/signals-and-systems-part-1-1>
6. <https://www.edx.org/course/signals-systems-part-2-iitbombayx-ee210-2x-3>

The break-up of CIE : Internal Tests + Assignments + Quizzes

1. No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2. No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3. No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Non Conventional Energy Sources

Open Elective-I

SYLLABUS FOR B.E. III SEMESTER

L: T: P (Hrs/Week):2:0:0	SEE Marks: 60	Course Code:U22OE310EE
Credits:2	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
To provide a survey of the most important renewable energy resources and the technologies for harnessing these resources within the framework of a broad range of simple to state-of-the-art energy systems.	<ol style="list-style-type: none"> 1. Demonstrate the generation of electricity from various Non-Conventional sources of energy and solar power generation 2. Illustrate the generation of energy from wind and generation of energy from waste 3. Demonstrate the generation of energy by biomass and fuel cells 4. Illustrate the ocean and geo thermal energy generation

UNIT-I: Introduction and Solar Energy:

Introduction: Need for Non-conventional energy sources, Types of Non-Conventional energy sources. Renewable energy across the Global and in India. Renewable energy for rural applications, Renewable energy for urban, industrial and commercial applications

Solar Energy: Solar cell fundamentals: Semiconductors, Photovoltaic effect, Solar PV cell, module, panel, array, Solar cell operating characteristics: Voltage-current characteristic, energy losses, maximising the performance. Applications of solar energy, Solar energy program in India, Case study

UNIT-II: Wind Energy and Waste to Energy:

Wind Energy: Nature of wind, Basic components of Wind Energy Conversion System(WECS), Power extraction from the wind, Applications of wind energy. Wind energy program in India, Case Study

Waste to Energy: Key issues, Waste recovery management, Case study

UNIT-III: Biomass Energy and Fuel Cells:

Biomass Energy: Definition, Bio fuels, Biomass resources, Biomass conversion technologies: Incineration- Thermo chemical conversion- Bio- chemical conversion. Advantages and disadvantages of biomass energy, Case study

Fuel Cells: Definition-Classification of fuel cells, Principle of operation, Hydrogen-oxygen fuel cell, Alkaline fuel cell, Proton exchange membrane fuel cell, Molten carbonate fuel cell, Solid oxide electrolyte cells, Comparison of fuel cells- Advantages and Disadvantages of fuel cells-Applications of Fuel cells. Case study

UNIT-IV: Ocean Energy and Geothermal Energy:

Ocean Energy: Ocean thermal electric conversion (OTEC) methods: Open cycle and Closed cycle- Principles of tidal power generation-Advantages and limitations of tidal power generation, Case study

Geothermal Energy: Geothermal resources- Vapour dominated geothermal plant- Liquid dominated geothermal plant- Applications of Geothermal Energy, Case study

Learning Resources:

1. B H KHAN, Non-Conventional Energy Resources, McGraw Hill, 2nd Edition, 2009.
2. G. S. Sawhney, Non-Conventional Energy Resources, PHI Learning Pvt Ltd, 2012
3. ShobhNath Singh, Non-Conventional Energy Resources, Pearson, 2016
4. G.D. Rai, Non-Conventional Energy Sources ,Khanna Publishers, New Delhi, 2011.
5. Ashok Desai V, Non-Conventional Energy, Wiley Eastern Ltd, 1990.
6. Mittal K.M, Non-Conventional Energy Systems, Wheeler Publishing Co. Ltd, 1997.
7. Ramesh R, Kurnar K.U, Renewable Energy Technologies, Narosa Publishing House, New Delhi, 1997.

The break-up of CIE : Internal Tests+Assignments+Quizzes

1. No. of Internal Tests	: 2	Max. Marks for each Internal Test	: 30
2. No. of Assignments	: 3	Max. Marks for each Assignment	: 5
3. No. of Quizzes	: 3	Max. Marks for each Quiz Test	: 5

Duration of Internal Tests :90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Mechanical Engineering

Introduction to Unmanned Aerial Vehicles

(Open Elective-I)

(Stream: Unmanned Aerial Vehicles)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U22OE310ME
Credits :02	CIE Marks:40	Duration of SEE:03Hours

COURSE OBJECTIVE	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
The objective of this Course is to understand the features of UAV, elements, navigation and guidance of UAV and to design and simulate UAV	<ol style="list-style-type: none"> 1. Explain the types and characteristics of UAVs and their applications. 2. Illustrate the concepts of aerodynamics of flight vehicle. 3. Identify and explain the components, sensors and payload of UAVs, their navigation and guidance. 4. Design and perform structural, aerodynamic analysis of UAV components

CO-Po and CO-PSO mapping															
CO	PO mapping												PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2				3	3	3				3	3	2	3
CO2	3	3				3	3	2				3	3	2	3
CO3	3	2				3	3	2				3	3	2	3
CO4	3	2				3	3	2				3	3	2	3

Unit-I: Introduction to UAV

UAV: Definition, History; Difference between aircraft and UAV; DGCA Classification of UAVs; Types and Characteristics of Drones: Fixed, Multi-rotor, and Flapping Wing; Applications: Defense, Civil, Environmental monitoring.

Unit-II: Basics of Flight

Different types of flight vehicles; Components and functions of an airplane; Forces acting on Airplane; Physical properties and structure of the atmosphere; Aerodynamics – aerofoil nomenclature, aerofoil characteristics, Angle of attack, Mach number, Lift and Drag, Propulsion and airplane structures.

Unit-III: UAV Elements, Navigation and Guidance

Components: Arms, motors, propellers, electronic speed controller (ESC), flight controller; Propulsion; Data Link; Sensors and Payloads: GPS, IMU, Light Detection and Ranging (LiDAR), Imaging cameras, Classification of payload based on applications; Hyper-spectral sensors; Laser Detection and Range (LADAR); Synthetic Aperture Radar (SAR); Thermal cameras; ultra-sonic detectors; Case study on payloads. Introduction to navigation systems and types of guidance; Mission Planning and Control.

Unit-IV: Design & Simulation of UAV

Introduction to CAD; Design of UAV components; Structural Analysis using CAE; Aerodynamic Analysis using CFD; Manufacturing of the components of UAVs: 3D printing; Case studies;

Learning Resources:

1. Andey Lennon, "Basics of R/C Model Aircraft Design" Model Airplane News Publication
2. John Baichtal, Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs.
3. [K Valavanis](#), [George J Vachtsevanos](#), Handbook of Unmanned Aerial Vehicles, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.
4. DGCA RPAS Guidance Manual, Revision 3 – 2020

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Mechanical Engineering

Introduction to Industrial Robotics

(Open Elective-I)

(Stream: Robotics)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U21OE320ME
Credits :02	CIE Marks:40	Duration of SEE: 03Hours

COURSE OBJECTIVE The objective of the course is to	COURSE OUTCOMES On completion of the course, students will be able to
study industrial robot components, configuration, sensors, drives, applications and programming through experiential learning.	<ol style="list-style-type: none"> 1 explain configuration of industrial robots and summarize various applications. 2 interpret various elements of the industrial robots 3 Develop methodology to represent position and orientation of industrial robot links in spatial coordinate system. 4 classify various sensors used in industrial robots and interface between the human user and an industrial robot using various programming languages.

CO-Po and CO-PSO mapping															
CO	PO mapping												PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2			1	2	2					2	3	1	2
CO2	3	2			1	2	2					2	3	1	2
CO3	3	2			1	2	2					2	3	1	2
CO4	3	2			1	2	2					2	3	1	2

UNIT-I

ROBOT BASICS

Robot-Basic concepts, Need, Law, History, Anatomy, specifications.

Robot configurations-cartesian, cylindrical, polar, articulated and SCARA. Parallel robots

ROBOT APPLICATIONS

Application in industry – material handling, loading & unloading, processing, welding & painting, assembly and inspection

UNIT-II

ROBOT ELEMENTS

End effectors-Classification, Types of Mechanical actuation, Gripper design, Robot joints types, Robot drive system types: Electrical, pneumatic and hydraulic. Position and velocity feedback devices

UNIT-III

ROBOT COORDINATE SYSTEMS

Coordinate frames, Rotation matrix, Euler angles, Roll pitch and yaw angle representation, Composite rotations, Homogeneous Transformation matrix.

UNIT-IV

ROBOT SENSORS

Sensors in robots – Touch sensors-Tactile sensors – Proximity and range sensors. Force sensors

Robot programming

On line programming, teach pendant control, Lead through, Walk through, off line programming, Task programming.

Learning Resources:

1. Mikell P. Groover, Mitchell Weiss, Roger N Nagel and Nicholas G Odrey, "Industrial Robotics Technology, Programming and Applications", Tata Mc Graw-Hill Publishing Company Limited , 2008.
2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata Mc Graw Hill Publishing Company Limited, 2010.

3. Klafter R.D, Chmielewski T.A, and Negin. M, "Robotic Engineering: An Integrated Approach", Prentice Hall of India Pvt. Ltd.,1994.
4. K.S. Fu, R.C. Gonzalez and C.S.G. Lee , "Robotics control, sensing, vision and intelligence", Tata Mc Graw-Hill Publishing Company Limited, 2008
5. R.K. Mittal and I. J. Nagrath"Robotics and Control", Tata Mc Graw-Hill Publishing Company Limited,2003.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max.Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
Department of Mechanical Engineering

Introduction to Automobile Engineering

(Open Elective-I)

(General Pool)

SYLLABUS FOR B.E.III-SEMESTER

L:T:P(Hrs/week):2:0:0	SEE Marks:60	Course Code: U22OE330ME
Credits :02	CIE Marks:40	Duration of SEE:03Hours

Course objectives	Course Outcomes
<p>The objectives of this course are to:</p> <ol style="list-style-type: none"> 1. familiarize the student with the different types of automobiles and engine components along with its working. 2. impart adequate knowledge in fuel supply, cooling, lubrication and ignition of IC engines. 3. understand the steering geometry, steering mechanism and types of suspension systems. 4. gain the knowledge about working of clutch, gear box mechanism, and brakes and make the student conversant with types of wheels, tyres 	<p>On completion of the course, the student will be able to:</p> <ol style="list-style-type: none"> 1. identify types of Automobiles and engine components and describe its working. 2. describe the engine fuel Supply system in petrol and Diesel engines, cooling system, and lubrication systems. 3. describe the steering mechanism, suspension systems 4. describe the working principle and operation of clutch, gear mechanism, brakes and identify the types of wheels, tyres

CO-Po and CO-PSO mapping															
CO	PO mapping												PSO mapping		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	1	1		1	2	2					3	3	2	3
CO2	3	2	2		2	2	2					3	3	2	3
CO3	3	2	2		1	2	2					3	3	2	3
CO4	3	1	2		2	2	2					3	3	2	3

UNIT-I

Introduction: Types of automobiles, Lay out of transmission system, Engine components: cylinder block, cylinder head, crankcase, crank shaft and cam shaft. Types and working of IC Engines: SI and CI engines, two stroke and four stroke engines.

UNIT-II

Fuel system: Fuel supply system for SI engines and CI engines. Simple carburettor, Introduction to Multipoint fuel injection system (**MPFI**) of petrol engines, Introduction to **CRDI** system for diesel engines.

Cooling system: air cooling, water cooling: Thermo syphon, pump circulation system.

Lubrication system: Petroil System, splash system, pressure lubrication: Wet sump and Dry Sump.

Ignition system: Battery Ignition System, Magneto Ignition System and Electronic Ignition System.

UNIT-III

Suspension system: Rigid axle, Independent suspension system: Double wish bone type, Macpherson strut system.

Steering system: wheel alignment, Ackermann steering mechanism, steering geometry: camber, caster, toe-in, toe-out, steering linkage for vehicle with rigid axle front suspension, steering linkage for vehicle with independent front suspension.

UNIT –IV

Power Train: Single plate clutch, Multi plate clutch. Manual Gear Box: sliding mesh gear box, constant mesh gear box, synchromesh gear box. Working principle of differential.

Brakes: Types: Drum and Disc brakes, Hydraulic Braking system, **ABS** system.

Wheels and Tyres: Types of Wheels: wire wheels, disc wheels, alloy wheels. Types of tyres: Tube type, tubeless type.

Learning Resources:

1. Crouse & Anglin, "Automobile Engineering", 10th Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2007.
2. Kirpal Singh, "Automobile Engineering", Vol.I& II, 13th Edition, Standard Publishers, New Delhi 2013.
3. R.B Gupta, "Automobile Engineering" 7th Edition, Satya Prakashan, New Delhi, 2015.
4. Joseph Heitner, "Automotive Mechanics", 2nd Edition, Affiliated East West Pvt. Ltd., 2013.
5. C.P. Nakra, "Basic Automobile Engineering", 7th Edition, Dhanpat Rai Publishing C (P) Ltd., 2016.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

- | | | | | |
|---|------------------------|----|------------------------------------|----|
| 1 | No. of Internal Tests: | 02 | Max. Marks for each Internal Test: | 30 |
| 2 | No. of Assignments: | 02 | Max. Marks for each Assignment: | 05 |
| 3 | No. of Quizzes: | 02 | Max. Marks for each Quiz Test: | 05 |

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (A)
DEPARTMENT OF CHEMISTRY

Materials for Engineers
(Stream: POLYMERIC MATERIALS)
OPEN ELECTIVE

Instruction :2Hour / Week	SEE- Marks : 60	Course Code : U22OE310CH
Credit : 2	CIE- Marks : 40	SEE- Duration : 2Hours

OBJECTIVES	OUTCOMES
The course will enable the students:	At the end of the course students should be able to:
1. To familiarize with various types of polymers 2. To acquaint with different methods of polymerization. 3. To converse the different polymerization techniques 4. To familiarize with various high performance/ specialty polymers.	1. Classify the polymers. 2. Analyze the different polymerization methods and their mechanisms. 3. Discuss the polymerization techniques used for the selected polymers. 4. Discuss the synthesis, properties and applications of selected polymers.

CO-PO MAPPING:												
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	3	-	-	-	-	-	1	-	-	-	-	1
2	3	1	-	-	-	-	1	-	-	-	-	1
3	3	-	-	-	-	-	1	-	-	-	-	1
4	3	-	-	-	-	-	1	-	-	-	-	1

UNIT-I: INTRODUCTION TO POLYMERS AND TYPES: (5h)

Introduction to various engineering materials, brief history of polymers, importance of polymers in engineering, terminology- ,classification of polymers- a) based on mechanism, b) based on chain topology, c) based on end use d) linear, branched and cross linked polymers e) based on physical state, Nomenclature based on source and based on IUPAC, applications of polymers.

UNIT-II: POLYMERIZATION: (7h)

Initiators- Types of Initiators, Thermal Decomposition of Initiators, Redox Initiation, Photochemical Initiation, Initiation by Ionizing Radiation, Pure Thermal Initiation, Other Methods of Initiation, Initiator Efficiency, Definition - Mechanism - Cage Effect.Step-Reaction (Condensation) Polymerization, Polymerization Mechanisms- Mechanism of Stepwise Polymerization, Radical Chain (Addition) Polymerization, Chain Polymerization, Ionic and Coordination Chain (Addition) Polymerization, Cationic Polymerization, Anionic Polymerization, Copolymerization - Mechanisms of Copolymerization, Block and Graft Copolymers

UNIT-III: TECHNIQUES OF POLYMERIZATION: (7h)

Living Radical Polymerization - General Considerations, Atom Transfer Radical Polymerization (ATRP) -Polymerization Mechanism, Stable Free-Radical Polymerization (SFRP), Radical Addition–Fragmentation Transfer (RAFT) -and Other Living Radical Polymerizations.process conditions -bulk (mass) polymerization - solution polymerization- emulsion & suspension polymerization - heterogeneous polymerization - other processes; self-assembly and nanostructures.

UNIT-IV: COMMERCIAL & HIGH-PERFORMANCE POLYMERS: (7h)

Synthesis, properties and applications of commercial polymers: polyvinyl chloride, polystyrene
Requirements for High-Temperature Polymers.

Synthesis, properties and applications of

1. Aromatic polyethers: Polyether sulfone,
2. Liquid crystal polymers: poly(oxy-1,4-phenylenecarbonyl),
3. Inorganic polymers – Minerals - Glasses – Ceramics,
4. Organometallic polymers – Polysilanes

Learning Resources:

1. PRINCIPLES OF POLYMERIZATION Fourth Edition GEORGE ODIAN, University of New York, New York.
2. TEXTBOOK OF POLYMER Science THIRD EDITION, FRED W. BILLMEYER, Troy, New York
3. P.C.Jain and Monica Jain, "Engineering Chemistry", DhanpatRai Pub, Co., New Delhi (2002)
4. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).
5. NPTEL Polymer Chemistry Course, D. Dhara, IIT Kharagpur.
6. Polymer chemistry by Gowariker

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	02	Max. Marks for each Assignment:	05
3	No. of Quizzes:	02	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **1 Hour 30 Minutes**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES

LEARNING TO LEARN

(General Pool Stream)

(Open Elective) SYLLABUS FOR B.E. 2/4 – III SEMESTER

Instruction: 2 Hours	SEE: 60	Course code: U22OE310EH
Credits: 2	CIE: 40	Duration of SEE: 3 Hours

<p>COURSE OBJECTIVES The course will enable the learners to:</p> <ol style="list-style-type: none"> 1. Develop effective study skills, and enable students to cut down on the number of hours spent studying. 2. Explore illusions of competence in learning, the challenges of overlearning, and the advantages of interleaving. 3. Handle procrastination and learn for long term. 4. Plan, prioritise and carry out tasks based on goals and priority. 	<p>COURSE OUTCOMES At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none"> 1. Get learners maximize their learning in a stipulated amount of time. 2. Become competent learners and learn creatively. 3. Meet deadlines, submit progress reports and recall what has been learnt for effective usage. 4. Set Performance Standards and take initiative based on set goals.
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OVERVIEW:

No matter what your skill levels in topics you would like to master, you can change your thinking and change your life. If you are struggling to cope, you'll see a structured treasure trove of practical techniques that walk you through what you need to do to get on track. If you've ever wanted to become better at anything, this course will help serve as your guide.

UNIT 1: STUDY SKILLS

Good study skills can increase a student's confidence, competence, and self-esteem. They can also reduce anxiety about tests and deadlines. This module is designed to develop effective study skills, and enable students to cut down on the number of hours spent studying, leaving more time for other important things in their life

- 1.1 Study Skills Checklist
- 1.2 Learning Styles
- 1.3 Habits of Effective Students
- 1.4 Using the Focused and Diffuse Modes
- 1.5 Introduction to memory and Memory Technique

UNIT 2: Chunking

In this module, we're going to be talking about chunks. Chunks are compact packages of information that your mind can easily access. We'll talk about how you can form chunks, how you can use them to improve your understanding and creativity with the material, and how chunks can help you to do better on tests. We'll also explore illusions of competence in learning, the challenges of overlearning, and the advantages of interleaving.

2. Knowledge Chunking
3. Skill and Will
4. Sleep and Learning

UNIT 3: Procrastination and Memory

In this module, we talk about two intimately connected ideas—procrastination and memory. Building solid chunks in long term memory--chunks that are easily accessible by your short term memory—takes time. This is why learning to handle procrastination is so important. Finally, we talk about some of the best ways to access your brain's most powerful long term memory systems so that learning is long term and the learner has the ability to recall and use it as per need.

3. Controlling Procrastination
4. Ranking the importance of tasks with a to- do list
5. Finding their most productive time
6. Keeping track of time spent on different tasks
7. Introduction to Deep learning

UNIT 4: Renaissance Learning and Unlocking Your Potential

In this module we're going to talk more about important ideas and techniques that will enhance student's ability to learn. Students will also discover how to more profitably interact with fellow learners, how to recognize your own strengths, and how to avoid the "imposter syndrome." Fighter pilots and surgeons use checklists to help them with their critical duties—you can use a similar checklist to help you prepare for tests. Ultimately, you will learn more about the joys of living a life filled with learning!

- 4.1 Psychology of Goal Setting
- 4.2 Criteria for Goal Setting
- 4.3 Steps in Goal Setting
- 4.4 Visioning
- 4.5 Strategy & Action Plan
- 4.6 Goal Progress Review

Learning Resources

learn.talentsprint.com

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
Duration of Internal Tests				:	90	Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State
DEPARTMENT OF MATHEMATICS

LINEAR ALGEBRA

(OPEN ELECTIVE-I for Civil, EEE, ECE, Mech of 2/4 B.E III-Sem)

L:T:P (Hrs./week):2:0:0	SEE Marks :60	Course Code: U22OE310MA
Credits : 2	CIE Marks: 40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
<i>The course will enable the students to:</i>	<i>At the end of the course students will be able to:</i>
1. Study the concept of Vector Spaces and understand the meaning of Basis and Dimension of a vector Space and Co-ordinates. 2. Understand the meaning of Linear transformation, properties. 3. Understand the Range and Kernel, Rank-Nullity and Matrix of Linear Transformation. 4. Understand the Inner Product Spaces, Orthonormal sets, Gram-Schmidt's Orthogonalization process.	1. Solve the problems on Vector Spaces and determine the Basis and Dimension of a Vector Space and find the Co-ordinates. 2. Determine the Linear Transformation, Range and Kernel and Matrix of Linear Transformation. 3. Determine the Range and Kernel, Rank-Nullity and Matrix of Linear Transformation. 4. Determine the distance, orthogonal, orthonormal sets and construct orthonormal basis based on Gram-Schmidt's Orthogonalization process.

UNIT – I**Vector Spaces**-Definition of a Vector Space, Subspaces, Basis and Dimension, Coordinates and Change of Basis.**UNIT – II****Linear Transformation - I**

Definition of Linear Transformation- Properties of Linear Transformations – Product of Linear Transformations – Algebra of Linear Operators- Linear sum- Scalar multiple-Composition of maps.

UNIT – III**Linear Transformation -II**

Range and kernel of a linear map – Dimension of Range and Kernel - Rank and nullity – Inverse of linear transformation - Rank nullity theorem (without Proof)- Matrix of Linear Transformation.

UNIT – IV

Inner Product Spaces-The Dot Product on \mathbb{R} and Inner Product Spaces, Orthonormal Bases, Orthogonal Complements- Gram-Schmidt's Orthonormalization process.

Learning Resources:

1. Introduction to Linear Algebra with Application, Author : Jim DeFranza, Daniel Gagliardi, Publisher : Tata McGraw-Hill
2. An Introduction to Linear Algebra, V.Krishna Murthy, V.P Mainra, J.L Arora, Affiliated to East-West Press Pvt Ltd

Reference Books:

1. Elementary Linear Algebra, Author: Anton and Rorres, Publisher: Wiley India Edition.
2. Advanced Engineering Mathematics, Author : Erwin Kreysig, Publisher : Wiley Publication
3. Elementary Linear Algebra, Author : Ron Larson, Publisher : Cengage Learning

Online Resources :

1. <http://mathworld.wolfram.com/topics>
2. <http://www.nptel.ac.in/course.php>

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90	Minutes		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS

SMART MATERIALS AND APPLICATIONS
(General Pool)
Open elective Course

L:T:P (Hrs./week):2:0:0	SEE Marks :60	Course Code: U22OE310PH
Credits : 2	CIE Marks: 40	Duration of SEE: 3 Hrs

Course Objectives	Course Outcomes	BTL
The student will be able to	the student should at least be able:	
1. grasp the concepts of piezo and ferro electric materials	1. summarize various properties and applications of piezo and ferro electric materials	2
2. Learn fundamentals of pyro and thermo electric materials	2. apply fundamental principles of pyro and thermo electricity in relevant fields of engineering	3
3. gain knowledge on shape memory alloys	3. Explain types of shape memory alloys and their properties and applications	3
4. acquire fundamental knowledge on chromic materials	4. Outline the importance of chromic materials in engineering fields.	2

UNIT I: PIEZO AND FERRO MATERIALS

Piezo electric effect and inverse piezoelectric effect, Piezo electric materials, Structure of Quartz crystal, Piezoelectric oscillator, Magnetostriction, Magnetostriction oscillator, piezo-electric sensors, applications of Piezo-electric materials. Characteristics and properties of ferro-electric materials, Curie-Weiss law, applications of Ferro electric materials

UNIT II: PYRO AND THERMO-ELECTRIC MATERIALS

Pyroelectricity: pyro electric effect, pyro electric materials, pyro-electric detector.

Thermoelectricity: thermoelectric effect, Seebeck effect, Peltier effect, thermocouple, Principle and working of thermoelectric generator and Thermoelectric cooler, applications of thermoelectric materials

UNIT III: SHAPE MEMORY MATERIALS

Introduction to shape memory alloys (SMA)- Shape Memory Effect (SME), Austenite, Martensite phases, Properties and characteristics SMAs, one-way and two way shape memory effects, Properties of Ni-Ti shape memory alloy, Cu-based shape memory alloys, and their applications, Applications of SMAs.

UNIT-IV:

Electro-chromaticity, Electro-chromic materials, Electro-chromic sensors and devices.

Photo-chromaticity, Photo-chromic materials, Photo-chromic sensors and devices.

Thermo-chromaticity, thermo-chromic materials, thermo-chromic sensors and devices.

Smart fluids: Magneto-rheological and Electro-rheological fluids.

Learning Resources:

1. K. Otsuka and C M Wayman, Shape memory materials, Cambridge university press, 1998.
2. T W Duerig, K N Melton, D Stockel, C M Wayman, Engineering aspects of shape memory alloys, Butterworth-Heinemann, 1990
3. A.K. Sawhney, A Course in Electronic Measurements and Instrumentation, Dhanpat Rai & Sons, 2015
4. D. Patranabis, Sensors and Transducers, PHI Learning Pvt. Ltd., 2013

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90	Minutes		

DEPARTMENT OF PHYSICS

ESSENTIALS OF SEMICONDUCTOR PHYSICS
(Stream: Semiconductor Physics and Device Applications)
(B.E-III Semester)

L:T:P (Hrs./week):2:0:0	SEE Marks :60	Course Code: U22OE320PH
Credits : 2	CIE Marks: 40	Duration of SEE: 3 Hrs

UNIT I: Basics of Quantum Mechanics (8 Hrs)

Existence of matter waves, Wave function and its significance, Schrodinger time dependent and independent wave equations, Wave equation of a free particle, Origin of band gap, Energy bands in solids, Postulates of quantum mechanics, Quantum mechanical operators and expectation values, Potential well , Quantum tunnelling.

UNIT II: Semiconductors: Energy Band and Charge Carriers (6 Hrs)

Types of semiconductors (doping, bandgap, composition), Fermi-Dirac statistics- Density of states of semiconductor, Fermi level in semiconductors, Law of mass action, Charge compensation and charge neutrality, Hall probes and its applications.

UNIT-III: Growth of Semiconductors (6 Hrs)

Introduction, Bulk crystal growth, Epitaxial crystal growth, Evaporation and sputtering, defects in crystal, Band gap engineering, GaAs crystal growth.

UNIT IV: Carrier Transport in Semiconductors (6 Hrs)

Carrier generation, Carrier life time, Carrier scattering and mobility, Low-field and high-field transport, introduction to diffusion, Drift-diffusion current and total current density, Einstein relation , Direct and indirect recombination and trapping, Current continuity equation, Carrier injection, ambipolar transport, Diffusion length.

References:

1. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
2. Donald Neamen, Semiconductors Physics and Devices, Tata Mc Graw Hill, 2003
3. Tyagi, Introduction to Semiconductor Materials and Devices, Wiley Publications, 2002.
4. Semiconductor Devices, Basic Principles Jasprit Singh, Wiley Publications, 2001
5. Electronic Devices and Circuits- Millman and Halkias-Tata Mc Graw Hill, 1983.
6. Solid State Electronic Devices - Ben G Streetman-Prentice Hall, New Delhi, 1995.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90	Minutes		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS

FUNDAMENTALS OF MATERIALS SCIENCE
(STREAM: MATERIALS SCIENCE FOR ENGINEERS)
(B.E-III Semester)

L:T:P (Hrs./week):2:0:0	SEE Marks :60	Course Code: U22OE330PH
Credits : 2	CIE Marks: 40	Duration of SEE: 3 Hrs

UNIT I: Atomic structure and Chemical Bonding

Structure of the atom, The quantum states, Forces between atoms, Ionization potential, Electron affinity and electronegativity. Bond energy, Bond type and Bond length. Types of Bonds-Ionic, Covalent, Metallic bonding, Hydrogen bond, Vanderwalls bond, Cohesive energy of ionic crystals, Madelung constant.

UNIT II: Atomic Packing

Simple crystal structures, Classification of close packings 2-D & 3-D, Voids in closed packings, size and coordination of voids, significance of voids, axial ratio and lattice constants, effect of radius ratio, representation of closed packing, Paulings rule, Applications of Paulings rule to actual structures, examples of closed packed structures. Line and surface density of atoms.

UNIT III: Diffusion in Solids

Solid state diffusion, Diffusion mechanisms, Self-diffusion, Impurity diffusion coefficient, Fick's laws, Diffusion coefficient, determination of diffusion coefficient, Random walk diffusion, Diffusion in a simple cubic structure, Diffusion under external field, Kirkendall shift, Ionic conductivity, Ionic conductivity of alkali halides.

UNIT-IV: Strengthening Mechanisms

Solidification of metals and alloys, cooling curves, concepts of nucleation and growth, Heat transfer associated in nucleation and growth, Homogeneous and Heterogeneous nucleation, Structure of metal ingots, Construction of binary alloys, Formation of alloy phases, viz. Solid solutions – substitutional and interstitial, intermetallic compounds.

References:

1. A.J.Dekker, Solid State Physics, Macmillan India Ltd., 2008.
2. V Raghavan, Materials Science and Engineering, PHI, 6th Edn, 2015
3. W.D. Callister Jr & David G. Rethwich, Materials Science and Engineering an Introduction-, John Wiley, 10th Edn, 2018.
4. M. A. Wahab, Solid State Physics, Narosa. 2015.
5. J. P. Srivastava, Elements of Solid-State Physics, PHI, 2014.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	2	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	2	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90	Minutes		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-22)

B.E. – INFORMATION TECHNOLOGY : THIRD SEMESTER (2023 - 2024)

B.E (IT) III-Semester (BRIDGE COURSE)								
Course Code	Course Name	Scheme of Instruction			Scheme of Examination			Credits
		Hours per week			Duration in Hrs	Maximum Marks		
		L	T	P/D		SEE	CIE	
THEORY								
UB22BS300MA	Matrix Theory and Vector Calculus	2	-	-	3	50	-	-
UB22ES310IT	Problem Solving through Programming using C	2	-	-	3	50	-	-
PRACTICAL								
UB22ES311IT	Problem Solving through Programming using C Lab	-	-	2	3	50	-	-
Total		4	-	2	-	150		
Grand Total		6+0=6						

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade
9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF MATHEMATICS

MATRIX THEORY & VECTOR CALCULUS
BRIDGE COURSE B.E. III-SEMESTER (CBCS)
(ForCSE, EEE, ECE & IT)

Instruction:	2 hours/Week	SEE Marks	:50	Subject Reference Code	UB22BS300MA
Credits:	-	CIE Marks	:-	Duration of SEE	3 Hrs

UNIT-I:
DIFFERENTIATION& INTEGRATION

Differentiation of standard functions(Formulae) - Partial Derivatives – Derivativeof Composite functions and Implicit functions - Chain Rule - Total Derivative

Integration - Elementary Integration – Integration of standard functions- Methods of Integration-Integration by substitution- Integration by parts.

UNIT –II
VECTOR DIFFERENTIATION

Scalar and Vector point functions -Vector Differentiation-Level Surfaces-Gradient of a scalar point function- Normal to a level surface- Directional Derivative – Divergence and Curl of a Vector field - Conservative vector field.

UNIT – III

MULTIPLE INTEGRALS: Double and Triple integrals (Cartesian) - Change of order of integration (Cartesian Coordinates).

VECTOR INTEGRATION: Line integral and Green's Theorem (without proof)

UNIT- IV

MATRIX THEORY

Rank of matrix- Echelon form - -System of Linear Equations- Consistency of Homogeneous and Non-homogeneous system of equations- Eigen values and EigenVectors.

Suggested Books:

1. B.S. Grewal, Higher Engineering Mathematics
2. Advanced Engineering Mathematics, Third Edition, R. K. Jain and S. R. K. Iyengar, Narosa Publishing House

VASAVICOLLEGE OF ENGINEERING (AUTONOMOUS)
IBRAHIMBAGH, HYDERABAD – 500031
DEPARTMENT OF INFORMATION TECHNOLOGY

Problem Solving through Programming using C
SYLLABUS FOR BRIDGE COURSE B.E. III-SEMESTER

L:T:P (Hrs./week): 2:0:0	SEE Marks : 50	Course Code: UB22ES310IT
Credits :--	CIE Marks : --	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
1. Acquire problem solving skills 2. Develop flow charts 3. Understand structured programming concepts 4. Write programs in C Language	1. Design flowcharts and algorithms for solving a problem and choose appropriate data type for writing programs in C language 2. Design modular programs involving input output operations, decision making and looping constructs 3. Apply the concept of arrays for storing, sorting and searching data 4. Apply the concept of pointers for dynamic memory management and string handling 5. Design programs to store data in structures and files

UNIT-I

Introduction to Computers: Computer Systems, Computing Environments, Computer Languages, Creating and Running Programs, Flowcharts.

Introduction to C Language- Background, C Programs, Identifiers, Types, Variables, Constants, Input/Output, Expressions, Precedence and Associativity, Side Effects, Evaluating Expressions, Type Conversion, Statements, Bitwise Operators.

UNIT-II

Selection: Logical Data and Operators, if... else, switch Statements, Standard Functions.

Repetition: Loops, while, for, do-while Statements, Loop Examples, break, continue, goto.

Functions: Designing Structured Programs, Functions Basics, User Defined Functions.

UNIT-III

Recursion-Recursive Functions, Preprocessor Commands.

Arrays: Two-Dimensional Arrays, Linear Search and Binary Search, Selection Sort and Bubble Sort.

UNIT-IV

Pointers: Introduction, Pointers to Pointers, Arithmetic operations using pointers

Strings – Concepts, C Strings, String Input/output, Functions, Arrays of Strings, String Manipulation Functions.

UNIT-V

Structure: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Unions.

Input and Output: Files, Streams, Standard Library Input/Output Functions, Character Input/Output Functions.

Learning Resources:

1. B. A. Forouzan & Richard F. Gilberg, "A Structured Programming Approach using C", 3rd Edition, Cengage Learning, 2013.
2. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", 2nd Edition, Prentice-Hall, 2006.
3. Rajaraman V, "The Fundamentals of Computer", 4th Edition, Prentice-Hall of India, 2006.
4. Steve Oualline, "Practical C Programming", 3rd Edition, O'Reilly Press.
5. Jeri R. Hanly, Elliot B. Koffman, "Problem Solving and Program Design in C", 5th Edition, Pearson Education, 2007.
6. E. Balagurusamy, "Programming in ANSI C", 4th Edition, TMG, 2008.
7. Gottfried, "Programming with C", 3rd Edition, TMH, 2010.
8. R G Dromey, "How to Solve it by Computer", 1st Edition, Pearson Education, 2006.

VASAVI COLLEGE OF ENGINEERING(AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY**PROBLEM SOLVING THROUGH PROGRAMMING USING C LAB**

SYLLABUS FOR BRIDGE COURSE B.E III SEMESTER

L:T:P (Hrs./week): 0:0:2	SEE Marks : 50	Course Code : UB22ES311IT
Credits : 1	CIE Marks : 30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
<i>The course will enable the students to:</i>	On completion of the course, students will be able to <i>At the end of the course students will be able to:</i>
<ol style="list-style-type: none"> Understand the fundamentals of programming in C Language Write, compile and debug programs in C. Formulate solution to problems and implement in C. Effectively choose programming components to solve computing problems. 	<ol style="list-style-type: none"> Choose appropriate data type for implementing programs in C language. Design and implement modular programs involving input output operations, decision making and looping constructs. Implement search and sort operations on arrays. Apply the concept of pointers for implementing programs on dynamic memory management and string handling. Design and implement programs to store data in structures and files.

Programming Exercise:

- Programs to illustrate arithmetic and bitwise operators
- Programs to illustrate selection control statements
- Programs to illustrate loop control statements.
- Programs to illustrate functions and recursion
- Programs to illustrate one dimensional arrays, searching and sorting.
- Programs to illustrate two dimensional arrays
- Programs on pointers
- Program on usage of built-in Functions for string manipulations.
- Programs on structures and unions.
- File handling programs.

Learning Resources:

- Forouzan B.A & Richard F. Gilberg, A Structured Programming Approach using C, 3rd Edition(2013), Cengage Learning.
- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, 2nd Edition (2006), Prentice-Hall.
- Steve Oualline, Practical C Programming, 3rd Edition(2006), O'Reilly Press.
- Balagurusamy E, Programming in ANSI C, 4th Edition(2008), TMG.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
SCHEME OF INSTRUCTION AND EXAMINATION (R-22)
B.E. – INFORMATION TECHNOLOGY : FOURTH SEMESTER (2023 - 2024)

B.E (IT) IV Semester								
Course Code	Course Name	Scheme of Instruction			Scheme of Examination			
		Hours per week			Duration in Hrs	Maximum Marks		Credits
		L	T	P/D		SEE	CIE	
U22BS420MA	Probability and Statistics	3	-	-	3	60	40	3
U22PC410IT	Computer Organization	3	-	-	3	60	40	3
U22PC420IT	Database Management Systems	3	-	-	3	60	40	3
U22PC430IT	Design & Analysis of Algorithms	3	-	-	3	60	40	3
U22PC440IT	Full Stack Development	3	-	-	3	60	40	3
U22OE4XXXX	Open Elective – II	3	-	-	3	60	40	3
U22HS030EH	Human Values and Professional Ethics – II	1	-	-	2	40	30	1
U22BS430MA	Skill Development Course – III (Aptitude – I)	1	-	-	2	40	30	1
U22PE410IT	Skill Development - IV (Technical Skills- II)	1	-	-	2	40	30	1
PRACTICALS								
U22PC421IT	Database Management Systems Lab	-	-	2	3	50	30	1
U22PC431IT	Design and Analysis of Algorithms Lab	-	-	2	3	50	30	1
U22PC441IT	Full Stack Development Lab	-	-	2	3	50	30	1
Co-Curricular Activities-II		-	-	-	-	-	-	-
Library /Sports/ Mentor Interaction		-	-	-	-	-	-	-
<ul style="list-style-type: none"> • Student should acquire one NPTEL Certification Course equivalent to 2 credits (8 weeks) by the end of VI Semester. • Students opting for Honours should complete one NPTEL Course of 2 credits (8 Weeks) by the end of IV Semester. 								
Total		21	-	6	--	630	420	24
Grand Total		27			--	1050		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF MATHEMATICS**PROBABILITY & STATISTICS**

for B.E. IV- Sem., (CBCS)

(For IT only)

L:T:P(Hrs./week): 3:0:0	SEE Marks:60	Course Code:U22BS420MA
Credits: 3	CIE Marks:40	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
<i>The course will enable the students to:</i>	<i>At the end of the course students will be able to:</i>
1. Study the concepts and application of conditional probability. 2. Understand various concepts of Random variables and standard Statistical Distributions. 3. Study various methods of testing large samples 4. Analyze standard statistical tests employed for small samples 5. Study the method to fit different curves to a given data and measuring the Correlation between variables.	1. Apply the conditional probability to the real world problems 2. Apply the various statistical distributions to solve practical problems. 3. Infer the properties of population conducting tests on large samples 4. Estimate unknown parameters of populations and apply the tests of hypotheses for small samples 5. Solve problems to fit various curves to the given data using curve fitting, and also to find co-efficient of correlation between the variables.

UNIT –I (10Hours)**Probability:**

Basic terminology- Definition of Probability – Addition Law of probability- Independent events- Conditional Probability- Multiplication law of probability - Baye's Theorem.

UNIT –II (12Hours)**Probability Distributions:**

Random Variables - Probability Distribution and Density function for Discrete and Continuous Random variables -Normal Distributions-Properties-Standard Normal variate.

UNIT-III (12Hours)**Tests of Hypothesis for Large samples:**

Introduction -Testing of Hypothesis- Null and Alternative Hypothesis -Errors- -Level of Significance –Confidence Intervals - One and two tailed tests - Tests of Significance for large samples – Tests for single mean- Difference of means.

UNIT-IV (8 Hours)**Tests of Hypothesis for Small samples:**

Tests of Significance for small samples - t-test for single mean and difference of means and F- test for comparison of variances - Chi-square test for goodness of fit.

UNIT-V (10 Hours)**Curve Fitting:**

Curve fitting by the Method of Least Squares - Fitting of Straight line - Second order curve (parabola) –Exponential Curve- Correlation – Karl Pearson's Co-efficient of Correlation.

Learning Resources:Text Books:

1. R.K. Jain & S.R.K. Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa Publications, 2007.
2. Higher Engineering Mathematics, Dr.B.S Grewal 40th Edition, Khanna Publishers.

Reference Books:

1. Advanced Engineering Mathematics, Kreyszig E, 8 th Edition, John Wiley & Sons Ltd, 2006.
2. A text book of Engineering Mathematics by N.P.Bali& Manish Goyal, Laxmi Publication.
3. Fundamentals of Mathematical Statistics, Gupta & Kapoor, Sultan chand& sons, New Delhi.

Online Resources:

- 1 <http://mathworld.wolfram.com/topics>
- 2 <http://www.nptel.ac.in/course.php>

The break-up of CIE : Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:		90 Minutes		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

Department of Information Technology**COMPUTER ORGANIZATION****SYLLABUS FOR IV-SEMESTER**

L:T:P(Hrs./week): 3:0:0	SEE Marks :60	Course Code : U22PC410IT
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
1. Provide the fundamentals of Computer Organization, basic processing units. 2. Explain input and output interfacing, memory and pipelining concepts.	1. Understand fundamentals of computer organization and instruction formats. 2. Analyse operations of arithmetic, logic, shift and control units. 3. Identify peripheral devices and analyse modes of data transfer. 4. Analyse the efficiency of cache, main memory and secondary storage. 5. Apply pipelining process to address structural, data and control hazards.

UNIT – I**Basic Structure of Computers :**

Computer Types, Functional Units, Basic Operational Concepts, Bus Structures, Software, Performance, Multiprocessors and Multicomputer, Memory locations and Addresses, Memory operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly language, Additional Instructions

UNIT – II**Basic Processing Unit:**

Register Transfer Language and Micro operations: Register Transfer Language, Register Transfer, Arithmetic Micro operations, Logic Micro operations, Shift Micro operations, Arithmetic logic shift unit.

MICROPROGRAMMED CONTROL: Control memory, address sequencing, micro program example, Design of control unit, hardwired control, micro programmed control.

UNIT – III**Input Output Organization:**

Peripheral devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, and Priority interrupt, Direct Memory Access.

UNIT – IV**Memory System**

Some Basic Concepts, Semiconductor RAM Memories, Read-Only memories, Cache Memories, Performance considerations, Virtual Memories, Memory Management Requirements, Secondary Storage-Magnetic Hard disks, Optical Disks, Magnetic Tape Systems

UNIT – V**Pipelining:**

Basic Concepts, Data Hazards, Instruction Hazards, Influence on Instruction sets, Data path and control considerations, Super Scalar Operation.

Learning Resources:

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer Organization, 5th Edition, McGraw Hill, 2002.
2. M. M. Mano, Computer System Architecture, 3rd Edition, Prentice Hall, 1994.
3. W. Stallings, "Computer Organization and Architecture - Designing for Performance", Prentice Hall of India, 2002.
4. J .P. Hayes, "Computer Architecture and Organization", McGraw-Hill, 1998.
5. Pal Chouduri, Computer Organization and Design, 2nd Ed. Prentice Hall of India, 2007
6. D. A. Patterson and J. L. Hennessy, "Computer Organization and Design - The Hardware/Software Interface", 2005.
7. <https://nptel.ac.in/courses/106106092/>

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY**DATABASE MANAGEMENT SYSTEMS**

SYLLABUS FOR IV-SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks :60	Course Code : U22PC420IT
Credits : 3	CIE Marks :40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
1. Explain the concepts of database management systems.	1. Identify the functional components of the DBMS, develop ER model for a given problem and map ER to Relational model.
2. Demonstrate conceptual and logical database design.	2. Formulate relational database principles using Relational Algebra and SQL Queries.
3. Explain the essential DBMS concepts like database security, integrity, concurrency, NoSQL databases.	3. Design a normalized database schema using different normal forms.
	4. Understand transaction processing and compare different concurrency control and recovery techniques.
	5. Understand NoSQL databases like HBase, Firebase, MongoDB, Cloud DB.

UNIT – I

Introduction to DBMS: Overview, File system vs DBMS, Advantages of DBMS, Database System Applications, Relational Databases, Object – Based and Semi-structured Databases, Data Storage and Querying, Database Architecture, Database Users and Administrators.

Database Design and the E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E-R Design Issues, Weak Entity Sets, Extended E-R Features.

UNIT – II

Relational Model: Structure of Relational Databases, Reduction to Relational Schemas, Other Aspects of Database Design. Relational Algebra: Fundamental Relational-Algebra Operations, Additional Relational – Algebra Operations, Extended Relational -Algebra Operations, Null Values, Modification of the Databases.

Structured Query Language: Data Definition, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Complex Queries, Views, Joined Relations, Indexing: Basic Concepts, Bitmap Indices, Index Definition in SQL.

UNIT – III

Advanced SQL and PLSQL: SQL Data Types and Schemas, Integrity Constraints, Authorization, SQL functions, procedural SQL, embedded SQL, cursors, ODBC and JDBC, triggers.

Schema Refinement: Features of Good Relational Design, Functional-Dependency Theory, Decomposition Using Functional Dependencies, Normalization, First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form.

UNIT – IV

Transactions: ACID properties, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Testing for serializability.

Concurrency Control: Lock-Based Protocols, Timestamp-Based Protocols, Validation-Based Protocols, Multiversion Schemes, Deadlock Handling.

Recovery System: Failure Classification, Storage Structure, Log-Based Recovery, Aries, Media recovery.

UNIT – V

NoSQL: Introduction to NOSQL, NoSQL Vs RDBMS, Categories of NoSQL Databases, Case studies: HBase, Firebase, MongoDB, Cloud DB.

Learning Resources:

1. Abraham Silberschatz, Henry F Korth, S. Sudarshan, Database System Concepts, 6th Edition, McGraw-Hill International Edition, 2011.
2. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, Third Edition, McGraw-Hill International Edition, 2003.
3. Elmasri, Navathe, Somayajulu and Gupta, Fundamentals of Database System, 6th Edition, Pearson Education, 2011.
4. Patric O'Neil, Elizabeth O'Neil, Database-principles, programming, and performance, Morgan Kaufmann Publishers, 2001.
5. Peter Rob, Carlos coronel, Database Systems, (2007), Thomoson.
6. <https://nptel.ac.in/courses/106105175/>

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY**DESIGN AND ANALYSIS OF ALGORITHMS**

SYLLABUS FOR B.E IV-SEMESTER

L:T:P(Hrs./week): 3:0:0	SEE Marks : 60	Course Code : U22PC430IT
Credits : 3	CIE Marks : 40	Duration of SEE: 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
1. Explain Asymptotic notations, time and space complexity analysis. 2. Discuss different algorithm design strategies and their applications. 3. Introduce NP-Hard and NP-Completeness concepts.	1. Understand asymptotic notations and analyze the complexity of recursive and non-recursive algorithms. 2. Illustrate divide & conquer and greedy algorithm design strategies. 3. Apply dynamic programming strategy to solve optimization problems. 4. Solve problems using backtracking and branch and bound. 5. Understand NP hard and NP completeness

UNIT-I

Introduction: Characteristics of algorithm. Analysis of algorithm: Asymptotic analysis of complexity bounds – best, average and worst-case behavior; Performance measurements of Algorithm, Analysis of recursive algorithms through recurrence relations: Substitution method, Recursion tree method, Amortized analysis, Disjoint Set-union-find, merge-find.

UNIT-II

Divide and conquer: The general method, Iterative and Divide and conquer for Binary search, Merge sort, Quick sort, Strassen's Matrix Multiplication Algorithm Masters' theorem.

Greedy Method: The general method, Knapsack problem, Job sequencing with deadlines, Optimal storage on tapes, Optimal merge patterns, Huffman Codes, Dijkstra's algorithm.

UNIT-III

Dynamic Programming: The general method, Bellman-Ford Algorithm, Multistage graph, All-Pairs Shortest Paths, Matrix chain multiplication, Optimal Binary Search trees, 0/1 Knapsack, Reliability design, Traveling Salesman Problem.

UNIT-IV

Backtracking: The general method, 8-Queens Problem, Graph Coloring, Hamiltonian cycles, Knapsack Problem

Branch and Bound: The general method, 0/1 Knapsack Problem, Traveling salesperson problem

UNIT-V

NP-Hard and NP-Completeness: Basic concepts, NP-hard graph problems-Clique Decision Problem, Node Cover Decision Problem, NP-Hard Scheduling Problem - scheduling identical processors, NP-Hard code scheduling problems – Code generation with common sub-expression.

Learning Resources:

1. Ellis Horowitz, Sartaj Sahani, Sanguthevar Rajasekaran, " Fundamentals of computer Algorithms", Second edition (2008),Universities Press
2. Thomas H. Cormen, Leiserson C.E, Rivest.R.L , Stein.C, Introduction to Algorithm, 2nd edition (2001), MIT press, USA.Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson,
3. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
4. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
5. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.
6. <https://nptel.ac.in/courses/106101060/>
7. <https://ocw.mit.edu/courses/electrical-engineering-and-computerscience/6-006-introduction-to-algorithms-fall-2011/lecture-videos>

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY**FULL STACK DEVELOPMENT****SYLLABUS FOR B.E IV- SEMESTER**

L:T:P (Hrs./week):: 3:0:0	SEE Marks : 60	Course Code: U22PC440IT
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
1. Provide basic skills for designing static and dynamic Web Applications using HTML, CSS, Java script & frame works like Bootstrap 2. Demonstrate how to design and develop web applications using Microsoft .NET Technology, Node JS, React and Mongo DB.	1. Design static web pages using HTML and CSS. 2. Create dynamic web pages with client-side validations using XML and JavaScript. 3. Develop responsive web applications using Bootstrap and ASP.NET framework. 4. Build cross-platform single page applications using React. 5. Develop web applications using Node.js and MongoDB.

UNIT-I**Introduction:** World Wide Web, Web Browsers, Web Servers, URL, HTTP, TCP Port.

HTML & CSS: Standard HTML document structure, Basic Tags, Images, Hypertext Links, Lists, Tables, Frames. Introduction to Cascading style sheets.

UNIT-II**JavaScript:** Introduction, Basics of JavaScript-variables, data types and operators, Control Structures, Arrays, Functions, HTML Forms, Events and event handling, Asynchronous JavaScript**XML :** XML: The Syntax of XML, XML Document Structure, Document Type Definitions.**UNIT-III****Bootstrap:** The Grid system, Layout components: Tables, Images, alerts, buttons, badges, progress bars, cards, drop downs, pagination, Collapse, Navbar, carousel.**.Net Framework and ASP.NET:**

.Net Framework Overview- Architecture, .Net Framework class Libraries, Introduction to Visual Studio. ASP.NET Benefits, ASP.NET Page Layout, Life Cycle, ASP.NET MVC Controllers, building an application using web form elements. Deploying an ASP.NET Core Application

UNIT-IV**React**

Introduction to React, Add React to a website, create a new React App, Introducing JSX, Rendering Elements, Components and Props, State and Lifecycle, Handling Events, Conditional Rendering, Lists and Keys, Forms. Building Single-Page applications with React.

UNIT-V**Application using Node JS and MongoDB:**

Introduction to Node.js-Installing Node.js- Using Events, Listeners, Timers, and Callbacks in Node.js, Introduction to Mongo DB - Accessing MongoDB from Node.js

Learning Resources:

- Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education.
- "Web Technologies", 7th Edition, Uttam K.Roy,2012.
- Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
- Dino Esposito, Programming ASP.NET Core (Developer Reference),2018
- Learning React Functional Web Development with React and Redux by Alex Banks, Eve Porcello, Alex Banks, Eve Porcello
- Brad Dayley, Brendan Dayley and Caleb Dayley, Node.js, MongoDB and Angular Web Development The definitive guide to using the MEAN stack to build web applications, 2nd Edition, Pearson Education, 2018
- <http://getbootstrap.com/>
- <https://reactjs.org/>
- <https://nodejs.org/en/>

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max.Marks for each Internal Tests:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: **90 Minutes**

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES**

HUMAN VALUES AND PROFESSIONAL ETHICS-II

(Common to all branches)

SYLLABUS FOR B.E. III & IV SEMESTERS

L:T:P (Hrs./week):: 1:0:0	SEE Marks : 40	Course Code: U22HS010EH
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

<p>COURSE OBJECTIVES</p> <ol style="list-style-type: none"> 1. Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations 1. Understand professionalism in harmony with self and society. 2. Develop ethical human conduct and professional competence. 3. Enrich their interactions with the world around, both professional and personal. 	<p>COURSE OUTCOMES</p> <p>At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none"> 1. Distinguish between Personal and Professional life goals– constantly evolving into better human beings and professionals. 2. Work out the strategy to actualize a harmonious environment wherever they work. 3. Distinguish between ethical and unethical practices, and start implementing ethical practices 4. Apply ethics and values in their personal and professional interactions.
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UNIT 1:

NORMATIVE ETHICS & SOCIETAL ETHICS

This unit deals with normative ethics, the branch of moral philosophy, or ethics, concerned with criteria of what is morally right and wrong. It includes the formulation of moral rules that have direct implications for what human actions, institutions, and ways of life should be like. This unit also covers societal ethics which is the systematic reflection on the moral dimensions of social structures, systems, issues, and communities.

- 1.1 Ethical Accountability
- 1.2 Society & Ethics
- 1.3 Rights & Responsibilities

UNIT 2:

PROFESSIONAL ETHICS - NEED FOR ETHICAL CODES

This unit covers the code of Professional Ethics- it is designed to ensure that students learn the necessary skills that groom them to behave like employees should, one that is socially acceptable and respectful of one another. It establishes the rules for behavior and sends a message to every employee that universal compliance is expected.

- 2.1 Professional Ethics
- 2.2 Ethical Code
- 2.3 Flipped Classroom

UNIT 3:

PRIVACY

This unit covers "Cyber ethics" - the code of responsible behaviour on the Internet. Just as we are taught to act responsibly in everyday life with lessons such as "Don't take what doesn't belong to you" and "Do not harm others," we must act responsibly in the cyber world as well. The basic rule is "Do not do something in cyberspace that you would consider wrong or illegal in everyday life."

- 3.1 Basics of Cyber Ethics
- 3.2 Privacy
- 3.3 Flipped Classroom

UNIT 4:

MEDIA AND MEDICAL ETHICS

This unit covers Media and Medical ethics is the best division of applied ethics dealing with the specific ethical principles and standards of media (including broadcast media, film, theatre, the arts, print media and the internet) and medicine (practice of clinical medicine and related scientific research)

- 4.1 Media Ethics
- 4.2 Medical Ethics
- 4.3 Flipped Classroom

MODE of DELIVERY

<ul style="list-style-type: none"> ● Questionnaires ● Quizzes ● Case-studies ● Observations and practice ● Home and classroom assignments 	<ul style="list-style-type: none"> ● Discussions ● Skits ● Short Movies/documentaries ● Team tasks and individual tasks ● Research based tasks ● Viva
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Relevant Websites, CD's and Documentaries

- Value Education website, <Http://www.universalhumanvalues.info> UPTU website, <Http://www.uptu.ac.in>
- Story of stuff, <Http://www.storyofstuff.com>
- Al Gore, As Inconvenient Truth, Paramount Classics ,USA
- Charlie Chaplin, Modern Times, United Artists, USA
- IIT Delhi, Modern Technology-The Untold story-Anand Gandhi, Right Here Right Now, Cyclewala production.

Learning Resources:

1. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
2. B.L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
3. A.N Tripathy, 2003 Human values, New Age International Publishers.
4. EG Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal tests	:	1	Max. Marks	:	20
2	No. of assignments	:	2	Max. Marks	:	5
3	No. of Quizzes	:	2	Max. Marks	:	5
	Duration of Internal Tests	:	90 Minutes			

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES**

SKILL DEVELOPMENT COURSE- III : (APTITUDE- I)

(Common to all branches)

SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week): 1:0:0	SEE Marks: 40	Course Code: U22BS430MA
Credits: 1	CIE Marks: 30	Duration of SEE: 02 Hrs

<p>COURSE OBJECTIVES The course will enable the learners to:</p> <ol style="list-style-type: none"> Students will be trained to enhance their employability skills. Students will be introduced to higher order thinking and problem solving skills in the following areas - Arithmetic Ability, Numerical Ability and General Reasoning. Students will be trained to work systematically with speed and accuracy while problem solving. Students will be trained to apply concepts like percentages and averages to solve complex problems. Students will be trained to use effective methods like elimination of options and shortcuts to solve problem accurately. 	<p>COURSE OUTCOMES At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none"> Solve questions in the mentioned areas using shortcuts and smart methods. Understand the fundamentals concept of Aptitude skills. Perform calculations with speed and accuracy. Solve complex problems using basic concepts. Use shortcuts with ease for effective problem solving.
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UNIT 1

QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -1

- 1.1 Time speed and distance
- 1.2 Boats and Streams
- 1.3 Problems on trains

UNIT 2

REASONING ABILITY- LOGICAL REASONING

- 2.1 Seating Arrangements- Linear; Circular; Complex
- 2.2 Venn diagrams
- 2.3 Syllogism
- 2.4 Cubes & Cuboids
- 2.5 Dices

UNIT 3

REASONING ABILITY- NON VERBAL REASONING

- 3.1 Figure Series
- 3.2 Directions
- 3.3 Clocks
- 3.4 Calendars

UNIT 4

QUANTITATIVE APTITUDE- ARITHMETIC ABILITY ADVANCED -2

- 4.1 Mensuration Part -1
- 4.2 Mensuration Part -2
- 4.3 Logarithms

UNIT 5

QUANTITATIVE APTITUDE- ENGINEERING MATHEMATICS

- 5.1 Permutations and combinations
- 5.2 Probability

Learning Resources :

Prescribed textbook for theory:

1. Quantitative Aptitude S.CHAND by RS AGARWAL
2. A Modern Approach to Verbal & Non-Verbal Reasoning S.CHAND by Dr. R S Aggarwal

Suggested Reading

1. Learn.talentsprint.com/References Courses
2. Quantitative Aptitude Disha Publications

Course Coordinator [Faculty Name]

BOS Chairman

3. LOGICAL Reasoning Disha Publications

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal tests	:	2	Max. Marks	:	20
2	No. of assignments	:	2	Max. Marks	:	5
3	No. of Quizzes	:	2	Max. Marks	:	5
Duration of Internal Tests		:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY**SKILL DEVELOPMENT COURSE- III : (TECHNICAL SKILLS- II)**

SYLLABUS FOR IV-SEMESTER

L:T:P (Hrs./week): 1:0:0	SEE Marks :40	Course Code : U22PE410IT
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
<ul style="list-style-type: none"> ❖ Understand the Nonlinear data structures and their applications. ❖ Prepare the students for the contests relative to the concepts learnt. ❖ Build confidence in coding using Non Linear Data structures ❖ Leverage the Industry Standards of the DBMS concepts 	<ol style="list-style-type: none"> 1. Learn non-linear data structures with various applications that are essential for solving problems which involve complex relationships, efficient searching, and hierarchical organization. 2. Solve scenario based problems using Tree Data structures. 3. Learn and apply greedy algorithms for efficient solutions to complex problems. 4. Learn and apply database concepts for designing efficient, reliable, and well-structured databases that meet the needs of modern applications.

Phase II**#7: Problem Solving through Non-Linear Data structures – Trees I**

Problem solving approaches using Non-linear data structures, Coding problemson the height of a binary tree, Size of a binary tree, Tree order traversals, Problem Solving on Binary Trees, Examples, Practice problems

#8: Problem Solving through Non-Linear Data structures – Trees II

Time comparison and analysis on Binary Search Trees & Coding problems, Search/probe sequence validation, Significance of height balancing the tree, Examples, Practice problems

#9: Problem Solving implementing Algorithms - Greedy Methods II

Algorithmic Thinking, Selection as Greedy Strategy, Heaps Min and Max, PriorityQueues, Greedy Coin change solution, Examples, Practice problems.

#10: Problem Solving implementing Algorithms - Greedy Methods II

Fractional Knapsack, Sequencing jobs with deadlines, Activity selection,Examples, Practice problems

#11: Problem Solving using DBMS I

Industry Standards of leveraging DBMS concepts: SQL Queries, Entity Relationship Models, Question, and answers

#12: Problem Solving using DBMS II

Industry Standards of leveraging DBMS concepts: Query Optimization, Transactions & Concurrency, Normalization, case studies, Question and answers

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF INFORMATION TECHNOLOGY

DATABASE MANAGEMENT SYSTEMS LAB

SYLLABUS FOR B.E. IV SEMESTER

L:T:P(Hrs/week): 0:0:2	SEE Marks :50	Course Code: U22PC421IT
Credits : 1	CIE Marks :30	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
Demonstrate SQL and PL/SQL constructs to develop a database application.	1. Design and implement a database schema. 2. Implement queries using SQL commands and SQLite. 3. Develop application programs using PL/SQL. 4. Develop a 2-tier Database Application.

1. DDL Commands:

- a. Creation of tables with appropriate integrity constraints
- b. Usage of alter, drop commands

2. DML Commands:

- a. Data Insertion and Updating
- b. Usage of truncate command

3. TCL and DCL Commands:

- a. Setting privileges
- b. save point, commit and rollback commands

4. SQL Queries:

- a. Simple SQL queries using Select
- b. SQL Built-in functions
- c. SQL Operators and Nested queries

5. Joins and aggregate functions

6. Grouping and ordering commands

7. PL/SQL:

- a. Blocks, Select Statement and control statements
- b. Stored procedures and functions

8. a. Packages and Exception Handling

- b. Cursors
- c. Triggers

9. SQLite: Simple Application Development using SQLite (DDL,DML Operations on SQLite).

10. Creation of full-fledged Database Application.

Learning Resources:

1. Ivan Bayross, SQL, PL/SQL, The Programming Language of Oracle,4th Edition, PBP Publications. Reference Books
1. NileshShah, Database Systems Using Oracle, 2nd Edition(2007), PHI.
2. Rick F Van der Lans, Introduction to SQL, 4thEdition(2007), Pearson Education.
3. Benjamin Rosenzweig Elena Silvestrova, Oracle PL/SQL by Example, 3rdEdition(2004), Person Education.
4. Albert Lulushi, Oracle Forms Developer's Handbook, 1st Edition(2006), Pearson Education.
5. <https://www.sqlite.org/index.html>
6. <https://www.lynda.com/Accessutorials/Welcome/195854/373426-4.html>

No. of Internal Tests: 02

Max. Marks for Internal Test: 12

Marks for day-to-day laboratory class work 18

Duration of Internal Test: **2 Hours**

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY**DESIGN AND ANALYSIS OF ALGORITHMS LAB**

SYLLABUS FOR B.E. IV SEMESTER

L:T:P (Hrs/week):0:0:2	SEE Marks : 50	Course Code : U22PC431IT
Credits : 1	CIE Marks : 30	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
Develop skills in design and implementation of abstractions of various algorithm strategies and their practical applications.	<ol style="list-style-type: none"> 1. Apply divide and conquer approach to solve searching and sorting problems. 2. Design and implement algorithms using Greedy strategy for the problems; Fractional knapsack, Huffman codes, shortest path finding (Dijkstra's algorithm). 3. Use Dynamic programming approach to solve problems including, shortest path finding (Bellman ford algorithm, All pair shortest path), Matrix chain multiplication, 0/1 Knapsack problem. 4. Solve N-Queens problem and Graph colouring problem using Backtracking approach. 5. Implement Branch & Bound algorithm for 0/1 Knapsack problem and Travelling Salesman problem.

- 1) A) Implement a stack using a linked list such that the push and pop operations of stack still take $O(1)$ time.
B) Implement a queue using a linked list such that the enqueue and dequeue operations of queue take $O(1)$ time
- 2) Implement Linear Search, Binary Search and Hashing.
- 3) Implement a parallelized Merge Sort algorithm and Quick sort algorithm to sort a given set of elements and determine the time required to sort the elements. Repeat the experiment for different values of n , the number of elements in the list to be sorted and plot a graph of the time taken versus n . The elements can be read from a file or can be generated using the random number generator. Program to be executed for various sizes of input. Fill the given table. Obtaining a constant value in the column "time taken" would prove that the complexity of merge sort is same in all case.

Size	Ascending		Descending		Random Order	
	Input	Time taken	Input	Time taken	Input	Time taken
4						
8						
16						
32						

- 4) Implement Knapsack Algorithm using Greedy Strategy.
- 5) Implement optimal merge patterns – Huffman encoding algorithm.
- 6) From a given vertex in a weighted connected graph, find single source shortest path to other vertices using a) Dijkstra's algorithm b) Bellman ford algorithm.
- 7) Implement Matrix –chain multiplication algorithm using dynamic programming.
- 8) Implement All-pairs shortest path algorithm.
- 9) Implement 0/1 Knapsack algorithm.
- 10) Implementation of N-queens problem using back tracking.
- 11) Implement Graph coloring problem using back tracking.
- 12) Develop a program to check whether a given graph is connected or not using DFS method.
- 13) Implement 0/1 knapsack using branch and bound.
- 14) Implement Travelling salesman problem using branch and bound.

Learning Resources:

1. Ellis Horowitz, Sartaj Sahani, Sanguthevar Rajasekaran, " Fundamentals of computer Algorithms", Second edition (2008), Universities Press
2. Thomas H. Cormen, Leiserson C.E, Rivest.R.L , Stein.C, Introduction to Algorithm, 2nd edition (2001), MIT press, USA.Introduction to Algorithms, 4TH Edition, Thomas H Cormen, Charles E Lieserson,
3. Algorithm Design, 1ST Edition, Jon Kleinberg and ÉvaTardos, Pearson.
4. Algorithm Design: Foundations, Analysis, and Internet Examples, Second Edition, Michael T Goodrich and Roberto Tamassia, Wiley.
5. Algorithms -- A Creative Approach, 3RD Edition, UdiManber, Addison-Wesley, Reading, MA.
6. B.A.Forouzan & Richard F.Gilberg, "A Structured Programming Approach using C" 2nd Edition, Cengage Learning, 2007.
7. Mark A Weiss, Data Structures and Algorithm Analysis In C, Second Edition(2002), Pearson
8. <https://ocw.mit.edu/courses/electrical-engineering-and-computerscience/6-006-introduction-to-algorithms-fall-2011/lecture-videos>
9. <http://nptel.ac.in/courses/106106127/>
10. <http://www.nptel.ac.in/courses/106102064>

No. of Internal Tests:	02
Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work	18
Duration of Internal Test:	2 Hours

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF INFORMATION TECHNOLOGY**FULL STACK DEVELOPMENT LAB****SYLLABUS FOR B.E IV- SEMESTER**

L:T:P (Hrs./week):: 0:0:2	SEE Marks : 50	Course Code : U22PC441IT
Credits : 1	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objective:	Course Outcomes:
The Objectives of the course:	<i>On completion of the course, students will be able to:</i>
Demonstrate the frameworks and technologies to design and develop web applications.	<ol style="list-style-type: none"> 1. Design and develop Web pages using HTML, CSS, javascript. 2. Develop Responsive web pages using frameworks. 3. Develop applications using ASP.NET. 4. Develop web applications using React, Node JS and MongoDB

I-HTML:

- Creation of HTML Document using basic tags.
- Creation of Menu using ordered and unordered list and other options.
- Creation of web page using table tags and their attributes
- Creation of web page using frames.
- Creation of document using CSS.

II-JAVASCRIPT & XML:

- Basic javascript programs using control statements, arrays and functions.
- Write a java script to validate the following fields in a registration page
 - i) Name (should contains alphabets and the length should not be less than 6 characters)
 - ii) Password(should not be less than 6 characters)
 - iii) E-mail(should not contain invalid addresses)
- Creation of XML document and validating it using DTD

III-BOOTSTRAP

- Design Responsive web pages using Bootstrap.

IV-.NET FRAMEWORK

- Develop an application for implementing Registration, validation, and Login using ASP.NET controls
- Create ASP.NET MVC App that does basic CRUD (create / read / update / delete operations)

V-NODE JS, REACT and MONGODB

- Develop web application using Node JS, React and Mongo DB

Learning Resources:

1. Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education.
2. "Web Technologies", 7th Edition, Uttam K.Roy,2012.
3. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
4. Dino Esposito, Programming ASP.NET Core (Developer Reference),2018
5. Learning React Functional Web Development with React and Redux by Alex Banks, Eve Porcello, Alex Banks, Eve Porcello
6. Brad Dayley, Brendan Dayley and Caleb Dayley, Node.js, MongoDB and Angular Web Development The definitive guide to using the MEAN stack to build web applications, 2nd Edition, Pearson Education, 2018
7. <http://getbootstrap.com/>
8. <https://reactjs.org/>
9. <https://nodejs.org/en/>

No. of Internal Tests:	02
Max. Marks for Internal Test:	12
Marks for day-to-day laboratory class work	18
Duration of Internal Test:	2 Hours

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
 SCHEME OF INSTRUCTION AND EXAMINATION (R20)
 B.E. – IT : FOURTH SEMESTER (2022 - 2023)**

SEMESTER - IV (BRIDGE COURSE)									
S No.	Course Code	Course Name	Scheme of Instruction			Duration in Hrs	Scheme of Examination		Credits
			Hours per week				Maximum Marks		
			L	T	P/D		SEE	CIE	
THEORY									
1	UB22HS410EH	English Language Communication	2	-	-	3	50	-	-
PRACTICAL									
1	UB20HS411EH	English Language Communication Skills Lab	-	-	2	3	50	-	-
Total			2	-	2	-	100	-	-
Grand Total			4			-	100		-

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD-31
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE AND COMMUNICATION (Theory)

Bridge Course for Lateral Entry Students

2023-2024 Batch – IV Semester

L: T: P (Hrs/Week) : 2 : 0 : 0	SEE Marks: 50	Course Code: UB22HS410EH
Credits: Nil	CIE Marks: Nil	Duration of SEE: 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Course will enable the Learners to:	At the end of the course the students will be able to :
1. Converse effectively in various context.	1. Use language in appropriate contexts.
2. Listen for general and specific comprehension and write paragraphs.	2. Listen for global comprehension and infer meaning from spoken discourses.
3. Understand the elements of a good paragraph	3. Write paragraphs coherently.
4. Speak appropriately in daily conversations	4. Use phrases, essential vocabulary and polite expressions in every day conversations.

Unit-1 1.0: Communication & Functional English

- 1.1** Role and Importance of Communication, Process of Communication, Non- verbal communication, barriers to Communication, overcoming barriers.
 Conversational phrases: greetings, introductions, apology, compliments, agreeing and disagreeing, polite forms in everyday conversations.

Unit 2 2.0: Listening

- 2.1** Importance of listening, Active listening

Unit 3. 3.0: Writing

- 1.1** Paragraph writing, coherence and cohesion.

Unit 4 4.0: Grammar and Vocabulary

- 4.1** Common Errors, one word substitutes, collocations.

Unit-5 5.0: Reading

- 5.1 Prose text-** Our Own Civilization—CEM Joad.

Prescribed textbook for theory:

Technical communication - Principles and Practice (2nd Edition 2014) - Meenakshi Raman and Sangeeta Sharma- Oxford University Press.

Suggested Reading

E.Suresh kumar, P. Sreehari and J. Savithri - Essential English
 Reading comprehension - Nuttal.J.C - Orient Blackswan
 Sunitha Mishra,C. Murali Krishna, Communication Skills for Engineers, Pearson, 2004.
 M. Ashraf Rizvi. Effective Technical Communication. Tata Mcgraw Hill, 2005.
 Allen and Waters., How English Works.
 Willis Jane., English through English.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD-31
DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES

ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB (ELCS)

Bridge Course for Lateral Entry Students

(Common to all branches)

2023-2024 Batch – IV Semester

L: T: P (Hrs/Week) : 0:0:2	SEE Marks: 50	Course Code: UB22HS411EH
Credits: Nil	CIE Marks: Nil	Duration of SEE: 2 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The Course will enable the learners to:	At the end of the course the learners will be able to :
2. Converse in various situations.	1. Participate effectively in group discussions, public speaking, debates (formal and informal)
3. Make paper and power point presentations.	2. Research and sift information to make presentations.
4. Speak effectively using discourse markers.	3. Listen for gist and make inferences from various speeches.
	4. Use connectives and make transitions effectively while speaking.

ELCS – Component - INTERACTIVE COMMUNICATION SKILLS LAB

Group discussion: Objectives of GD, Types of GDs; Initiating, Continuing, and concluding a GD.

Debate: Understanding the differences between a debate and a group discussion, essentials of debate, concluding a debate.

Role Plays: Types of Role plays (formal and informal), use of discourse markers.

Presentation Skills: Making effective presentations, researching on various topics, use of Audio visual aids, coping with nerves.

Prescribed textbook for laboratory:

Speak Well: Jayshree Mohanraj, Kandula Nirupa Rani and Indira Babbellapati - Orient Black Swan.

Longman Dictionary of Contemporary English - 6th Edition, 2020. (The students will be given the PDF format).

Learning Resources:

1. Balasubramanian: A textbook of English phonetics for Indian students, Macmillan, 2008.
2. Priyadarshini Patnaik : Group discussion and interviews, Cambridge University Press India private limited 2011.
3. Daniel Jones: Cambridge English Pronouncing Dictionary - A Definitive guide to contemporary English Pronunciation.

**IV – Semester Open Electives
(OPEN ELECTIVE-II)
Academic Year 2023-24**

S. No.	Dept.	Streams	Course Code	Name of the Course	Credits
1	Civil	General Pool	U22OE410CE	Disaster Management	3
2	ECE	General Pool	U22OE410EC	Mathematical Programming for Engineers	3
3		Communication Engineering Stream	U22OE440EC	Introduction to Principles of Communication Engineering	3
4	EEE	General Pool	U22OE410EE	Solar Power and Applications	3
5	Mechanical	Unmanned Aerial Vehicles	U22OE410ME	Design Principles of UAVs	3
6		Robotics	U22OE420ME	Kinematics and Dynamics of Robotics	3
7		General Pool	U22OE430ME	Optimization Methods	3
8	H&SS	General Pool	U22HS430EH	Critical Thinking	3
9	Maths	General Pool	U22OE410MA	Numerical Methods	3
10	Physics	Semiconductor Physics and Device Applications	U23OE410PH	Basic Semiconductor Devices	3
11		Materials Science For Engineers	U23OE420PH	Synthesis and Properties of Materials	3

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF CIVIL ENGINEERING
DISASTER MANAGEMENT (Open Elective-II)

SYLLABUS FOR B.E.IV-SEMESTER

L:T:P(Hrs./week):3:0:1	SEE Marks:60	Course Code: U22OE410CE
Credits: 3	CIE Marks:40	Duration of SEE : 3Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
In this subject the students will	Upon the completion of this course students will be able to
<ol style="list-style-type: none"> 1. Know about the state of art of disaster management in world and explore the history of the disasters and comprehend how past events have helped shape the future. 2. Study the various natural and manmade disasters and apply the mitigation measures. 3. Expose students to various technologies used for disaster mitigation and management. 	<ol style="list-style-type: none"> 1. Attain knowledge on various types, stages, phases in disaster international policies and programmes with reference to the disaster reduction. 2. Understand various types of natural disaster, their occurrence, Effects, Mitigation and management System in India. 3. Understand different types of manmade disasters, their occurrence, Effects, Mitigation and Management System in India. 4. Explain the utility of geography information systems (GIS), Remote sensing technology in all phases of disaster mitigation and management. 5. Understand the Role of Remote Sensing and Geographical Information Systems (GIS) in Disaster Management.

UNIT-I: Introduction: Hazard, vulnerability and risk, Types of disasters, Disaster management cycle, Progress of disaster management in world, vulnerability profile of India, Disaster management act, Disaster management in India.

UNIT-II: Natural Disasters-Hydro-meteorological based disasters: Tropical cyclones, floods, drought zones- Causes, Types, effects and Mitigation measures.

UNIT-III: Natural Disasters Geographical based disasters: Earthquake, Tsunamis, Landslides and avalanches – Causes, Types, effects and Mitigation measures.

UNIT-IV: Human Induced hazards: Chemical industrial hazards, major power break downs, traffic accidents, etc.

UNIT-V: Role of Remote Sensing and Geographical Information Systems (GIS) in Disaster Management: Introduction to remote sensing and GIS, its applications in disaster management.

Learning Resources:

1. Rajib, S and Krishna Murthy, R.R.(2012) "Disaster Management Global Challenges and Local Solutions "Univerities Press, Hyderabad, 2012.
2. Navele, P & Raja, C.K. (2009), Earth and Atmospheric Disasters Management, Natural and Manmade, B.S. Publications, Hyderabad, 2009.
3. Battacharya, T. Disaster Science and Management, Tat McGraw Hill Company, New Delhi, 2012.

The break-up of CIE: Internal Tests +Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90	Minutes		

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Mathematical Programming for Engineers

(General Pool: Open Elective - II)

SYLLABUS FOR B.E. IV – SEMESTER (Civil, CSE, EEE, IT, Mechanical)

L:T:P (Hrs./week) : 3:0:0	SEE Marks : 60	Course Code: U22OE410EC
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
To provide fundamental knowledge of programming language for solving problems.	On completion of the course, students will be able to <ol style="list-style-type: none"> 1. Generate arrays and matrices for numerical problems solving. 2. Represent data and solution in graphical display. 3. Write scripts and functions to easily execute series of tasks in problem solving. 4. Use arrays, matrices and functions in Engineering applications 5. Design GUI for basic mathematical applications.

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	1	-	-	3	-	-	-	-	-	-	-	-	2	3
CO2	-	2	-	-	3	-	-	-	-	-	-	-	-	2	3
CO3	1	1	2	2	3	-	-	-	-	-	-	-	-	2	3
CO4	1	2	-	-	3	-	-	-	-	-	-	-	-	2	3
CO5	-	1	1	1	3	-	-	-	-	-	-	-	-	2	3

UNIT - I : Introduction:

Basics of MATLAB, MATLAB windows, Advantages of MATLAB, on-line help, file types.

MATLAB Basics: Variables and Constants – Vectors and Matrices- Arrays - manipulation- Built-in MATLAB Functions. Creating and printing simple plots, Creating, Saving and Executing a Script File, Creating and Executing a function file.

Programming Basics: Data types-Operators – Hierarchy of operations, Relational and logical operators, if-end structure, if-else-end structure, if-elseif-else-end structure, switch-case statement, for-end loop, while-end loop, break and continue commands.

UNIT - II : Scripts and Functions

Script Files, Function Files, Debugging methods in MATLAB.

Graphics: Basic 2D plots: Printing labels- grid and axes box- Entering text in a box- Axis control-Style options-Multiple plots-subplots-specialized 2D plots: stem-, bar, hist, pi, stairs, loglog, semilog, polar, comet 3D plots: Mesh, Contour, Surf, Stem3, ezplot.

UNIT - III : Numerical Methods Using MATLAB

Numerical Differentiation, Numerical integration- Newton-Cotes integration formulae, Multi-step application of Trapezoidal rule, Simpson's 1/3 Rule for Numerical Integration. MATLAB functions for integration.

Linear Equations- Linear algebra in MATLAB, Solving a linear system, Gauss Elimination, Finding eigen values and eigen vectors, Matrix factorizations, Advanced topics.

UNIT - IV : Nonlinear Equations

System of Non-linear equations, Solving System of Equations Using MATLAB function fsolve, Interpolation-Lagrange Interpolation, Two dimensional Interpolation, Straight line fit using Least Square Method, Curve fitting using built-in functions polyval and polyfit, cubic fit using least square method. Finding roots of a polynomial -roots function, Newton-Raphson Method.

UNIT - V :

Solution of Ordinary differential Equations (ODEs)-The 4th order Runge-kutta Method, ODE Solvers in MATLAB, Solving First-order equations using ODE23 and ODE45.

Structures and Graphical user interface using app Designer: Advanced data Objects, How a GUI works, Creating and displaying a GUI. GUI components, Dialog Boxes.

Learning Resources:

1. Getting started with MATLAB "A quick introduction for scientist and engineers by Rudra Pratap, Oxford publications.
2. Advanced Guide to MATLAB-Practical Examples in Science and Engineering by S.N.Alam, S.Islam, S.K. Patel-I.K. International Publishing House Pvt. Ltd.

3. Stephen J. Chapman-"MATLAB Programming for Engineers"- 5th Edition- Cengage Learning- 2015. Getting started with MATLAB (Version 9) The Math works.
4. An Introduction to MATLAB® Programming and Numerical Methods for Engineers 1st Edition by Timmy Siauw Alexandre Bayen, Elsevier-18th April 2014.
5. <https://nptel.ac.in/courses/103106118/2>
6. <https://www.udemy.com/numerical-methods/>

The break-up of CIE : Internal Tests + Assignments + Quizzes

1.	No. of Internal Tests	:	2	Max. Marks for each Internal Test	:	30
2.	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
ACCREDITED BY NAAC WITH 'A++' GRADE
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
Introduction to Principles of Communication Engineering
(Communication Engineering Stream: Open Elective - II)
SYLLABUS FOR B.E. IV – SEMESTER (other branches)

L:T:P (Hrs./week): 3:0:0	SEE Marks: 60	Course Code: U22OE440EC
Credits: 3	CIE Marks: 40	Duration of SEE: 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
Distinguish analog and digital Modulation techniques used in various Communication systems.	On completion of the course, students will be able to 1. Analyze the power and transmission bandwidth of Amplitude and Frequency Modulated signals. 2. Familiarize the process of reproduction of base band signal. 3. Analyze various pulse analog and pulse digital Modulation Techniques. 4. Understand the transmission of binary data in communication systems. 5. Estimate information content in a system

CO-PO-PSO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2												3	
CO2	3	2												3	
CO3	3	2												3	
CO4	2	2												3	
CO5	2	3												3	

UNIT - I

Amplitude Modulation: Introduction to Modulation, Need for Modulation, Modulation index, Side bands, AM Power, Double Side Band Suppressed Carrier Modulation, Single Side Band Modulation, Vestigial Side Band Modulation, AM demodulation, Frequency Division Multiplexing,

Lab Activity: Generation of AM using MATLAB and Simulink.

UNIT - II

Angle Modulation: Angle Modulation fundamentals, Frequency Modulation – Modulation index and sidebands, Narrowband FM, Wideband FM, Principles of Phase Modulation, FM demodulation

Lab Activity: Generation of FM signals using MATLAB and Simulink.

UNIT - III

Signal Sampling and Analog Pulse Communication: Ideal Sampling, Pulse Amplitude Modulation, Pulse Width Modulation, Pulse Position Modulation.

Digital Communication Techniques: Quantization, Data Conversion, Time Division Multiplexing, Pulse Code Modulation, Delta Modulation.

Lab Activity: Demonstration of Sampling using MATLAB.

UNIT - IV

Transmission of Binary Data in Communication Systems: Digital Codes, Principles of Digital Transmission, ASK, FSK, BPSK

Lab activity: Demonstration of ASK and BPSK using SIMULINK.

UNIT - V

Information Theory: Uncertainty, Information and entropy. Discrete memory less channels

Source Coding Techniques: Shannon-Fano coding, Huffman Coding

Lab activity: Entropy calculations using MATLAB

Learning Resources:

1. Louis E. Frenzel, Principles of Electronic Communication Systems, 3rd Edition. Tata Mcgraw Hill.
2. Wayne Tomasi, Electronic Communications Systems, 5th Edition, Pearson Education.

The break-up of CIE : Internal Tests + Assignments + Quizzes

1.	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2.	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3.	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5

Duration of Internal Tests: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
 IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Solar Power and Applications

Open Elective-II
 SYLLABUS FOR B.E. IV SEMESTER

L: T: P (Hrs/Week):3:0:0	SEE Marks: 60	Course Code: U22OE410EE
Credits:3	CIE Marks: 40	Duration of SEE: 3Hours

COURSE OBJECTIVES	COURSE OUTCOMES
The course will enable the students to:	On completion of the course, students will be able to
To impart the basics of solar energy harnessing and solar panel and array.	<ol style="list-style-type: none"> 1. Compare different energy resources. 2. Identify and choose proper type of meter for solar radiation measurement. 3. Use proper solar thermal system according to the load requirements. 4. Categorize and compare photovoltaic cells. 5. Apply the knowledge of solar energy.

Unit – I

Fundamentals of Energy Sources: Oil crisis of 1973, Classifications of Energy Resources, Importance of Non-conventional energy sources, Advantages-disadvantages and salient features of Non-conventional energy sources.

Unit – II

Solar Energy Basics: Sun as a source of energy, the Earth, Radiation Spectrums, Extraterrestrial and Terrestrial Radiations, Depletion of solar Radiation, Pyranometer, Pyrheliometer, Sunshine Recorder.

Unit – III

Solar Thermal Systems: Solar Collectors, Solar Water Heater, Solar Passive space – heating and cooling systems, Solar Cookers, Solar furnaces, Solar thermal water pump, Vapour compression refrigeration and Solar pond Electric power plant.

Unit – IV

Solar Photovoltaic Systems: Solar Cell fundamentals, Cell characteristics, Cell classification, Module, Panel and Array, Maximizing the Solar PV output and load matching, MPPT.

Unit – V

Solar PV systems & Applications: Solar PV system classification - Stand-Alone Solar PV system and Grid-Interactive Solar PV system. Applications - Water Pumping, lighting, medical refrigeration, village power and Telecommunication.

Suggested Reading:

5. B H Khan, Non-Conventional Energy Resources, 2nd Edition, Tata McGraw Hill.
6. G. D. Rai, Non-Conventional Energy Sources, 13th Reprint 2014, Khanna Publications.

The break-up of CIE : Internal Tests+Assignments+Quizzes

1. No. of Internal Tests	: 2	Max. Marks for each Internal Test	: 30
2. No. of Assignments	: 3	Max. Marks for each Assignment	: 5
3. No. of Quizzes	: 3	Max. Marks for each Quiz Test	: 5

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF MECHANICAL ENGINEERING

Design Principles of UAVs
(Stream: Unmanned Aerial Vehicles - Open Elective-II)
SYLLABUS FOR B.E. IV-SEMESTER

Instruction : 3Hours /week	SEE Marks : 60	Course Code : U22OE410ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
	<i>On completion of the course, students will be able to</i>
The objective of this Course is to understand the features of fundamentals of design and parameters, aerodynamic design, performance, weight estimation and stability of UAVs	<ol style="list-style-type: none"> 1. Describe the design fundamentals of UAVs. 2. Apply the fundamental parameters in the design of UAVs. 3. Analyze the aerodynamic design of UAVs. 4. Explore the design concepts for the performance of UAVs. 5. Estimate the weight and stability of UAVs.

CO-Po and CO-PSO mapping																
CO	PO mapping												PSO mapping			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	3	3	2			3	3	3				3	3	3	3	
CO2	3	3	3			3	3	2				3	3	3	3	
CO3	3	3	3			3	3	2				3	3	3	3	
CO4	3	3	3			3	3	2				3	3	3	3	
CO5	3	3	3			3	3	2				3	3	3	3	

UNIT I: Design Fundamentals:

Introduction, UAV Classifications, Design Criteria, Objectives, and Priorities, Feasibility Analysis, Design Groups, Design Disciplines, Design Process: UAV Life Cycle, Systems Engineering Approach, Conceptual Design, Preliminary Design, Detail Design, Design Review, Evaluation and Feedback.

UNIT II: Fundamental parameters

Various methods to measure flight velocity: using Pitot tube and Pitot static tube, with numerical problems, Variation of Pressure, density and temperature with altitude, Standard atmosphere with numerical problems. Anatomy of Airplane: Various control surfaces for an airplane: Airfoil Nomenclature: Design steps to construct an Airfoil.

UNIT III: Aerodynamic design: Lift and drag.

Generation of Lift and drag: How lift is generated, Variation of lift with angle of attack, Sources of Drag. Aerodynamic center, Center of pressure, Various wing planforms, Mean aerodynamic cord. Lifting line theory, NACA airfoils, Drag generation and dear polar. Difference between Airfoil and Finite wing, Numerical problems on wing planforms. Interpreting airfoil data, Lift curve slope of finite wing, Drag Polar, Numerical problems on selection of an airfoil.

UNIT IV: Design for performance: Thrust and power.

Introduction to Airplane performance, Equation of motion in parallel and perpendicular direction of motion, Steady Level flight, Thrust required for steady level flight, thrust required curve, thrust available curve for reciprocating and Jet engine, Power Required and Power available curve. Numerical problems on calculation of performance parameters, Selection of power plant. Rate of climb and Climb angle, Climb performance, Engine sizing, Power Plant selection.

UNIT V: Weight estimation and stability

Weight estimation, Common propulsion systems, Electric Propulsion, Battery Sizing, Iterative weight estimation, Wing sizing, Wing Planform selection and sizing, Case study demonstration of Flight test, Effect of variation of CG location, Static Stability, Effects of C.G. location on static stability, Longitudinal Static stability, Contribution of tail in static stability, Neutral point.

Learning Resources:

1. Andey Lennon, "Basics of R/C Model Aircraft Design" Model Airplane News Publication
2. John Baichtal, Building Your Own Drones: A Beginners' Guide to Drones, UAVs, and ROVs.

3. K Valavanis, George J Vachtsevanos, Handbook of Unmanned Aerial Vehicles, New York, Springer, Boston, Massachusetts : Credo Reference, 2014. 2016.
4. DGCA RPAS Guidance Manual, Revision 3 – 2020

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

VASAVI COLLEGE OF ENGINEERING (Autonomous)

IBRAHIMBAGH, HYDERABAD – 500 031

DEPARTMENT OF MECHANICAL ENGINEERING**Kinematics and Dynamics of Robotics****(Open Elective-II)****(Stream: Robotics)****SYLLABUS FOR B.E. IV-SEMESTER**

Instruction : 3Hours /week	SEE Marks : 60	Course Code : U22OE420ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

COURSE OBJECTIVE	COURSE OUTCOMES
The objective of the course is to	On completion of the course, students will be able to
To develop the fundamental knowledge and skills required to analyze, design and control robotic systems	1. Analyze the kinematics of robotic systems and apply them to solve real world problems 2. Apply differential kinematics and statics concepts to design and control robotic systems 3. Analyze the dynamics of serial manipulators using lagrangian and Newton-Euler mechanics 4. Develop motion and force control strategies for robotic systems using feedback control techniques 5. Generate and analyze robot trajectories for various applications

CO-PO and CO-PSO mapping																
CO	PO mapping												PSO mapping			
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	
CO1	2	2	2			2			2	2		2	3	2	1	
CO2	2	2	2			2			2	2		2	3	2	1	
CO3	3	3	3			3			3	3		2	3	2	1	
CO4	3	2	2		3	3		3	2	2	3	3	3	2	1	
CO5	2	2	2		2	2		2	2	2	2	2	3	2	1	

UNIT-I**Robot Kinematics**

Forward Kinematics: Forward/direct kinematic analysis of serial manipulators.

Inverse Kinematics: General properties of inverse kinematic solution. Inverse kinematics of serial RR planar manipulators.

UNIT-II**Differential Kinematics**

Linear and angular velocity of links, Velocity propagation, Manipulator Jacobian for serial manipulators, Jacobian Singularities.

UNIT-III**Static Analysis:** Force and moment balance, Jacobian in statics.**Dynamics of serial manipulators**

Lagrangian formulation for equations of motion for RP, RR serial manipulators,

Unit-IV**Dynamics of serial manipulators**

Recursive dynamics using Newton-Euler formulation of RP and RR serial manipulator.

UNIT-V**Trajectory Generation****Joint-Space Techniques:** Cubic Polynomial Trajectories, Linear Segments with Parabolic Blends-without and with via points**Cartesian-Space Techniques:** Straight line path, Circular Path, Position Planning, Orientation Planning.

Learning Resources:

1. Bruno Siciliano, Lorenzo Sciavicco, Luigi Villani, Giuseppe Oriolo, "Robotics: Modelling, Planning and Control", Springer Science & Business Media, 2010.
2. M.W.Spong and M.Vidyasagar, "Robot Dynamics and Control", 1st Edition, John Wiley and sons, 1990.
3. R.K.Mittal and I.J.Nagrath, "Robotics and Control", Tata McGraw-Hill, 2003.
4. Subir Kumar Saha, "Introduction to Robotics", Tata McGraw-Hill Education, 2014.
5. Howie M. Choset, Seth Hutchinson, Kevin M. Lynch, "Principles of Robot Motion: Theory, Algorithms, and Implementation", MIT Press, 2005.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05
Duration of Internal Test: 90 Minutes				

VASAVI COLLEGE OF ENGINEERING (Autonomous)
IBRAHIMBAGH, HYDERABAD – 500 031
DEPARTMENT OF MECHANICAL ENGINEERING

Optimization Methods
(General Pool Open Elective-II)
SYLLABUS FOR B.E. IV-SEMESTER

Instruction : 3Hours /week	SEE Marks : 60	Course Code : U22OE430ME
Credits : 3	CIE Marks : 40	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The objectives of this course are to: understand Linear & non-linear programming, transportation modeling , CPM & PERT for project scheduling and control, and application of various optimization techniques for respective field engineering (Inter disciplinary)	On completion of the course, the student will be able to: 1. Optimization of resources in multi disciplinary areas through linear programming under different conditions. 2. Understand revised simplex methods per customer requirements to suit for various Organizations. 3. Minimization of total cost to apply for transportation techniques for the transshipment of Goods and products and Implement techniques like project management 4. Optimization of resources in multi disciplinary areas through non-linear programming under different conditions.

UNIT-I**Optimization-An overview**

Meaning of Optimization-Origin of Optimization-Introduction to Linear programming problems (LPP) -Formulation of LPP-Graphical method, simplex method.

UNIT-II**Advanced topics in Linear programming**

Special cases in simplex method, Duality in LPP, Differences between primal and dual, shadow prices, Dual simplex method, Revised simplex method.

UNIT-III**Transportation Model**

Introduction to Transportation model-Formulation and solution of transportation models- Methods for calculating Initial basic feasible solution-Optimization of transportation model using MODI method.

Project Scheduling

Introduction to network analysis, Rules to draw network diagram, Fulkerson rule for numbering events, Critical path method.

UNIT-IV**Non linear programming problems**

Optimization methods for single variable, multivariable functions, Maxima-Minima

One Dimensional Minimization: Uni-modal Function, Unrestricted search, Exhaustive search, Dichotomous search, Interval Halving method, Fibonacci and golden bisection Method , Newton and Quasi Newton method.

UNIT-V

Non Linear - Unconstrained optimization: classification, Univariate search, pattern Directions, Hook Jeeves, Powel method, steepest decent method.

Learning Resources:

1. Singiresu S. Rao, "Engineering optimization- Theory and Practice", 4thEdition, John Wiley and Sons, 2009.
2. NVS Raju, "Optimization Methods for Engineers ", PHI Learning Pvt. Ltd., 2014.
3. Prem Kumar Gupta and Dr. DS Hira, "Operations Research ", S.Chand & Company Pvt. Ltd., 2014.
4. R. Paneerselvam, "Operations Research", PHI Learning Pvt Ltd., 2009.
5. Kalyanmoy Deb, Optimization for Engineering Design- algorithms and examples, PHI Pvt. Ltd, 1st edition 2003, Delhi.

The break-up of CIE: Internal Tests+ Assignments + Quizzes

1	No. of Internal Tests:	02	Max. Marks for each Internal Test:	30
2	No. of Assignments:	03	Max. Marks for each Assignment:	05
3	No. of Quizzes:	03	Max. Marks for each Quiz Test:	05

Duration of Internal Test: 90 Minutes

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES**

CRITICAL THINKING
(Open Elective)
SYLLABUS FOR B.E. 2/4 – IV SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U22HS430EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

<p>COURSE OBJECTIVES The course will enable the learners to:</p> <ol style="list-style-type: none"> 1. Identify the core skills associated with critical thinking. 2. Comprehend the various techniques of critical thinking 3. Evaluate data and draw insights from it to make the right decisions 4. Understand where to look for bias and assumptions in problem 5. Understand structure, standards and ethics of critical writing 	<p>COURSE OUTCOMES At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none"> 1. Analyse and compare techniques for comparing alternate solutions 2. Demonstrate the difference between deductive and inductive reasoning and construct logically sound arguments 3. Check for accuracy of data and use it as a tool for problem solving 4. Evaluate, identify and distinguish between relevant and irrelevant information to formulate a thesis or hypothesis. 5. Employ evidence and information effectively
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UNIT 1**COMPONENTS OF CRITICAL THINKING**

- 1.1 Applying Reason
- 1.2 Open Mindedness
- 1.3 Analysis
- 1.4 Logic

UNIT 2**NON-LINEAR THINKING**

- 2.1 Step out of your Comfort Zone
- 2.2 Don't Jump to Conclusions
- 2.3 Expect and Initiate Change
- 2.4 Being Ready to Adapt

UNIT 3**LOGICAL THINKING**

- 3.1 Ask the Right Questions
- 3.2 Organize Data
- 3.3 Evaluate Information
- 3.4 Draw Conclusions

UNIT 4**INFER MEANING FROM INFORMATIVE TEXTS**

- 4.1 Making Assumptions
- 4.2 Watch out for Bias
- 4.3 Ask Clarifying Questions
- 4.4 SWOT Analysis

UNIT 5**PROBLEM SOLVING**

- 5.1 Identifying Inconsistencies
- 5.2 Trust your Instincts
- 5.3 Asking Ask?

METHODOLOGY

- Case Studies
- Demonstration
- Presentations
- Expert lectures
- Writing and Audio-visual lessons

LEARNING RESOURCES

learn.talentsprint.com

1. Calling Bullshit: The Art of Skepticism in a Data-Driven World. by Carl Bergstrom & Jevin West. ...
2. Thinking, Fast and Slow. by Daniel Kahneman. ...
3. Factfulness: Ten Reasons We're Wrong About The World — And Why Things Are Better Than You Think. ...
4. Box Thinking: The Surprising Truth About Success. ...

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal tests	:	2	Max. Marks	:	30
2	No. of assignments	:	3	Max. Marks	:	5
3	No. of Quizzes	:	3	Max. Marks	:	5
Duration of Internal Tests		:	90 Minutes			

ASSESSMENTS

- Online assignments
- Individual and Group

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
HYDERABAD
DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES**

TECHNICAL WRITING AND PROFESSIONAL PRESENTATIONS
(Open Elective) SYLLABUS FOR B.E. 2/4 – IV SEMESTER

Instruction: 3 Hours	SEE: 60	Course code: U21OE020EH
Credits: 3	CIE: 40	Duration of SEE: 3 Hours

<p>COURSE OBJECTIVES The course will enable the learners to:</p> <ol style="list-style-type: none"> 1. Understand the principles and mechanics of technical writing for students of engineering. 2. Identify different kinds of business correspondences and the dos and don'ts for each of them. 3. Make effective presentations as part of today's workplace demands. 4. Recognize the need for Video and Written CVs with focus on specific elements. 5. Comprehend skills associated with technical writing and understand different papers ranging from process description and feasibility reports to research projects, project proposals, and SOPs 	<p>COURSE OUTCOMES At the end of the course the learners will be able to: -</p> <ol style="list-style-type: none"> 1. Write effective reports. 2. Articulate business correspondences based on need. 3. Make persuasive presentations. 4. Design their videos CVs. 5. Write papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose
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UNIT 1: FORMAL & INFORMAL TECHNICAL REPORTS

- 1.1 Informal Report Formats
- 1.2 Project and Research Reports
- 1.3 Formal Report Components, Feasibility Reports, Evaluation reports
- 1.4 Analytical and Informational reports
- 1.5 Executive summaries.

UNIT 2: BUSINESS CORRESPONDENCE

- 2.1 Electronic communication
- 2.2 Effective emails
- 2.3 Instant and text messaging guidelines

UNIT 3: PROFESSIONAL PRESENTATIONS

- 3.1 Paper presentations & Poster presentations
- 3.2 PowerPoint presentations
- 3.3 Storyboard writing

UNIT 4: RESUME & CVs

- 4.1 Technical Resume
- 4.2 Cover letter, resume format
- 4.3 Video CVs

UNIT 5: WRITING PROPOSALS & SOPs

- 5.1 Types of proposals
- 5.2 Request for proposals
- 5.3 Stating your objective.

METHODOLOGY

- Case Studies
- Demonstration
- Presentations
- Expert lectures
- Writing and Audio-visual lessons

ASSESSMENTS

- Online assignments
- Individual and Group

LEARNING RESOURCES

learn.talentsprint.com

1. Read Me First!: A Style Guide for the Computer Industry by Sun Technical Publications
2. Eats, Shoots and Leaves Paperback – 18 February 2010 by Lynne Truss
3. Don't Make Me Think, Revisited: A Common Sense Approach to Web & Mobile Usability | Third Edition | By Pearson Paperback –
4. The Design of Everyday Things: Revised and Expanded Edition Paperback – Illustrated, 5 November 2013 by Don Norman (Author)

The break-up of CIE: Internal Tests + Assignments + Quizzes

1	No. of Internal tests	:	<table border="1"><tr><td>2</td></tr></table>	2	Max. Marks	:	<table border="1"><tr><td>30</td></tr></table>	30
2								
30								
2	No. of assignments	:	<table border="1"><tr><td>3</td></tr></table>	3	Max. Marks	:	<table border="1"><tr><td>5</td></tr></table>	5
3								
5								
3	No. of Quizzes	:	<table border="1"><tr><td>3</td></tr></table>	3	Max. Marks	:	<table border="1"><tr><td>5</td></tr></table>	5
3								
5								

Duration of Internal Tests : 90 Minutes

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

Accredited by NAAC with A++ Grade

9-5-81, Ibrahimbagh, Hyderabad-500031, Telangana State

DEPARTMENT OF MATHEMATICS**NUMERICAL METHODS****(Open Elective for CSE, AIML & IT only)****For B.E., IV - Semester – CBCS**

Instruction: 3:0:0	SEE Marks: 60	Course Code : U22OE410MA
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hours

COURSE OBJECTIVES	COURSE OUTCOMES
<i>The course will enable the students to:</i>	<i>At the end of the course students will be able to:</i>
1. Study the various numerical methods to solve Algebraic and Transcendental equations. 2. Understand the methods to solve linear system of equations. 3. Understand the numerical methods in interpolation and extrapolation. 4. Understand the numerical methods in interpolation using central differences. 5. Understand the numerical methods in solving ordinary differential equations.	1. Apply the numerical methods to solve Algebraic and Transcendental equations which cannot be solved by traditional algebraic methods 2. Solve the linear system of equations using direct and iteration methods. 3. Use the various numerical methods in interpolation and extrapolation. 4. Use the various numerical methods in interpolation using central differences. 5. Find the numerical solutions of ordinary differential equations.

Unit – I**Solution of Algebraic and Transcendental equations:**

Intermediate value property of equations-Solution of Algebraic and Transcendental equations: Bisection method, Newton-Raphson method Regula-Falsi method.

Unit – II**Solution of linear system of equations:**

Direct methods- Gauss elimination method- Factorization method- Iterative methods: Jacobi's Iteration method- Gauss - Seidel Iteration method-III-conditioned system of equations.

Unit – III**Numerical differences-I**

Introduction to finite differences - Interpolation- Newton's Forward and Backward Interpolation Formulae – Interpolation with unequal intervals – Lagrange's Interpolation Formula – Divided differences- Newton's divided difference formula.

Unit – IV**Numerical differences-II**

Central differences interpolation-Gauss's forwards and backward difference formulae-Stirling's formula- Bessel's formula.

Unit – V**Numerical Solutions of Ordinary Differential Equations**

Numerical Solutions of Ordinary Differential Equations: Taylor's Series Method - Euler's Method - Modified Euler's Method – Runge-Kutta of 4th order (without proofs).

Learning Resources:**Text Books:**

- Numerical methods in engineering and science by B.S.Grewal, Khanna publishers
- Advanced Engineering Mathematics by R.K.Jain&S.R.K.Iyengar, Narosa publishing house.

Reference Books:

- Numerical Analysis by S.S.Sastry, PHI Ltd.

Online Resources :

- <http://mathworld.wolfram.com/topics>

2. <http://www.nptel.ac.in/course.php>

The break-up of CIE : Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS

Basic Semiconductor Devices
(Stream: Semiconductor Physics and Device Applications)
(B.E-IV Sem)

Instruction: 3:0:0	SEE Marks: 60	Course Code : U23OE410PH
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hours

UNIT I: Junction Diode

Basic structure of PN junction, Band bending, zero bias condition, Expression for built in potential, Electric field and space charge width, Abrupt and Graded junctions, Diode equation, Effect of temperature on PN junction diode, Capacitive effects in PN junction, Diode –applications.

UNIT II: Metal-Semiconductor Junction

Schottky and Ohmic contacts, Schottky barrier diode, Current voltage relationship, comparison of Schottky barrier diode and pn junction diode, Static Barrier Characteristics, Dynamic Characteristics, Ohmic Contact, Metal Oxide Semiconductor Capacitor-Capacitance-Voltage, Ideal MOS system-Threshold voltage.

UNIT III: Special Semiconductor Devices

Small signal equivalent circuits of PN-diode, short and long diode, Breakdown mechanisms in Zener diode, Varactor diode, Tunnel diode, Gunn diode, Shockley diode, IMPATT diode.

UNIT IV: BJT and Thyristor

BJT's – Construction and characteristics, Thyristor – Construction, working and characteristics, comparison of BJT and Thyristor, Heterojunction Bipolar junction transistor, Basics of gate turn-off thyristor (GTO), SiC based Bipolar Devices-Applications, Building a GaN Transistor-GaN Transistor Electrical Characteristics.

UNIT V: Fabrication Techniques

BJT fabrication: Diffused, point contact, fused or alloy and rate grown techniques, molecular beam epitaxy (MBE), epitaxial vapour phase, Liquid phase growth.

References:

1. P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997).
2. Donald Neamen, Semiconductors Physics and Devices, Tata Mc Graw Hill, 2003
3. Tyagi, Introduction to Semiconductor Materials and Devices, Wiley Publications, 2002.
4. Semiconductor Devices, Basic Principles Jasprit Singh, Wiley Publications, 2001
5. Electronic Devices and Circuits- Millman and Halkias-Tata Mc Graw Hill, 1983.
6. Solid State Electronic Devices - Ben G Streetman-Prentice Hall, New Delhi, 1995.

The break-up of CIE : Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:	90 Minutes			

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF PHYSICS

SYNTHESIS AND PROPERTIES OF MATERIALS
(Stream: MATERIALS SCIENCE FOR ENGINEERS)
(B.E-IV Semester)

Instruction: 3:0:0	SEE Marks: 60	Course Code : U22OE420PH
Credits : 3	CIE Marks: 40	Duration of SEE : 3 Hours

UNIT I: SYNTHESIS OF MATERIALS- PHYSICAL METHODS (10 hours)

Solid state reaction, diffusion, melt quenching, vapor deposition, Chemical vapor deposition, physical vapor deposition, sputtering, mechanical milling, electron beam deposition.

UNIT II: SYNTHESIS OF MATERIALS- CHEMICAL METHODS (8 hours)

Introduction, slow evaporation at room temperature, high-temperature solution growth, Sol-gel process, Aerosol method, Hydro-thermal process, Solvo-thermal synthesis, Photo-chemical synthesis.

UNIT III: Electrical Properties of Materials (8 hours)

The Boltzmann transport equation, Electrical conductivity, electrical conductivity at low temperatures, Matthiessen's rule, Thermal conductivity, Wiedemann-Franz law, Hall-effect, Temperature variation of electrical conductivity

UNIT-IV: Physical properties of Materials (10 hours)

Fundamentals of magnetism, different types of magnetism, Permeability, Magnetic Hysteresis, Coercive force. Young's modulus, Bulk modulus, Modulus of rigidity, tensile testing and tensile strength, breaking strength, plastic deformation, failure analysis, hardness-testing, Brinell's, Viker's impact testing – toughness, resilience, scratch test.

UNIT-V: Optical and Thermal Properties of Materials (10 hours)

Optical properties: photoconductivity, optical absorption & transmission, energy band gap determination, photoluminescence, phosphorescence, electroluminescence.

Thermal properties: concept of phonons, thermal conductivity, specific heat, exothermic & endothermic processes.

References:

10. A.J.Dekker, Solid State Physics, Macmillan India Ltd., 2008.
11. V Raghavan, Materials Science and Engineering, PHI, 6th Edn, 2015
12. W.D. Callister Jr & David G. Rethwisch, Materials Science and Engineering an Introduction-, John Wiley, 10th Edn, 2018.
13. M. A. Wahab, Solid State Physics, Narosa. 2015.
14. J. P. Srivastava, Elements of Solid-State Physics, PHI, 2014.

The break-up of CIE : Internal Tests + Assignments + Quizzes

1	No. of Internal Tests	:	2	Max. Marks for each Internal Tests	:	30
2	No. of Assignments	:	3	Max. Marks for each Assignment	:	5
3	No. of Quizzes	:	3	Max. Marks for each Quiz Test	:	5
	Duration of Internal Tests	:		90 Minutes		